TAJOR: Tanjungpura Journal of Coaching Research

Tanjungpura Journal of Coaching Research

Support by :
Departmant of Sport Coaching Education
Universitas Tanjungpura

VOLUME 1 | ISSUE 3 | NOVEMBER 2023

VOLUME 1 NOMOR 3 NOVEMBER 2023

Daftar Isi

Published by :
Dapertement of Sport Coaching Education,
Teaching Training and Education Science Fakulty, Universitas Tanjungpura

Address:
Jl. Nurul Huda Campus III Sports Science Faculty of Teacher Training and Education Tanjungpura University Parit Baru Sungai Raya District Kubu Raya Regency, West Kalimantan-78391

Our Journal Indexed by:

Dimensions | GARUDA | Google Scholar | Crossref

Tanjungpura Journal of
Coaching Research
Tanjungpura Journal of Coaching Research 2023: 1(3): 71-78
https://jurnal.untan.ac.id/index.php/TAJOR/index

Original Research

Analysis of physical fitness in students: a comparative study based on social status

Haura Athaya[1ABCD]*, Julian Dewantara[2BDE], Muhamad Husein[2DE], Redha Taiar[3BE], Nor Fazila Abd Malek[4E], Manish Shukla[5CD]

[1]*Department of Sport Coaching Education, Universitas Tanjungpura, Indonesia*
[2]*Department of Sports Science, Universitas Negeri Yogyakarta, Indonesia*
[3]*Department of Physical and Sports Education, Reims University, Reims, France*
[4]*Department of Sports Science and Coaching, Sultan Idris Education University, Malaysia*
[5]*Department of Physical Education, Agra College, Agra, India*
**Coresponding Author: hauraathaya22@student.untan.ac.id*

Authors' contribution:
A. Conception and design of the study; B. Acquisition of data; C. Analysis and interpretation of data; D. Manuscript preparation; E. Obtaining funding

How Cite: Athaya, H., Dewantara, J., Husein, M., Taiar, R., Malek, N. F. A., & Shukla, M. (2023). Analysis of physical fitness in students: a comparative study based on social status. *Tanjungpura Journal of Coaching Research, 1*(3), 71–78. https://doi.org/10.26418/tajor.v1i3.66542

Abstract

Background and Study Aim. Physical fitness serves as a significant indicator of an individual's health and overall well-being. This research aims to analyze students' physical fitness by conducting a comparative study based on social status. Physical fitness was measured as an indicator of students' health and well-being.

Material and Methods. Quantitative descriptive research using survey method. This study involved low-grade students from two elementary schools, namely Mujahidin Elementary School and State Elementary School 16 Rasau Jaya, which have different social status. The sampling method used purposive sampling technique, with a total sample of 40 students from each school. Physical fitness data collection was conducted using the Indonesian Physical Fitness Test. Analysis was assisted using the SPSS 26 application.

Results. The results showed a significance value of 0.538 > 0.05 that there was no significant difference in physical fitness between students from both schools based on social status. Although there were variations in the mean physical fitness scores, the differences did not reach the level of statistical significance.

Conclusions. This study contributes to the understanding of physical fitness differences based on social status among low-grade students. The implications of the results of this study can be used for the development of more focused intervention programs to improve physical fitness, especially among students with economic and educational challenges.

Article History
Received: 20.06.2023
Accepted: 08.09.2023
Published: 31.11.2023

Keywords
Physical Fitness _1;
Student _2;
Social Status _3;
Elementary School _4;

Introduction

Physical fitness serves as a significant indicator of an individual's health and overall well-being. The comprehension of factors influencing physical fitness, particularly among lower-class learners

e-ISSN:2988-4942

considering their social status, is paramount (Candra et al., 2023; Utesch et al., 2018). Social status encompasses various dimensions, including economic background, education, and accessibility to healthcare facilities (Garzia et al., 2019). Examining the disparities in physical fitness stemming from these social inequities not only holds relevance for the development of public health policies but also offers profound insights into the societal elements impacting the health of young individuals (Goodyear et al., 2019).

The connection between physical fitness and health is intimate. Lower physical fitness levels in students render them susceptible to illnesses and diminish their overall health (Nurcahyo, 2015). Adequate health and nutritional provisions play a crucial role in facilitating smooth growth and development of the brain organs, thereby shielding children from diseases. In developing countries, nutritional imbalances such as undernutrition and obesity often coexist. As per the 2018 Riskesdas data, updated every five years, nutritional status in Indonesia for children aged 5-12 years reveals 2.4% are underweight, while 9.2% are overweight (Ernawati et al., 2019). Undernutrition and overweight frequently give rise to health complications (Rachmi et al., 2017).

Lower-class students often encounter distinct challenges in maintaining their physical fitness (Diamond, 2015). Economic constraints may impede their access to sports facilities, and parents' education levels can influence their awareness of the importance of a healthy lifestyle (Rodrigues et al., 2019). The question is: to what extent can this social status be an indicator of differences in the physical fitness levels of lower-class learners?

Research indicates that the socio-economic conditions of learners' parents exhibit considerable diversity, and the learners' socio-economic status significantly impacts endeavors to enhance physical fitness (Garzia et al., 2019). Physical fitness is influenced by a range of factors, encompassing both internal and external elements. Internal factors include permanent aspects present in an individual's body, such as genetics, age, and gender, while external factors involve physical activity, the environment, and smoking habits (Rohmatin & Wulan, 2019).

This study was conducted to gain a comprehensive understanding of the disparities in physical fitness among lower-grade learners based on their social status. By exploring these factors, areas requiring special attention can be identified to enhance the health and fitness of young people facing economic and educational challenges (Limanskaya et al., 2020). The primary objective is to analyze and comprehend how the social status of lower-class learners may impact their physical fitness levels. Consequently, the results are anticipated to lay the groundwork for designing more effective and socially just interventions to enhance physical fitness among lower-class learners.

This research holds relevance in the context of advancing public health, particularly among lower-class learners. A nuanced understanding of the differences in physical fitness resulting from social status allows stakeholders to develop targeted and accessible programs for improving the health and fitness of learners in this socio-economic segment. By spotlighting disparities in physical fitness based on social status, this study aims to make a positive contribution to the overarching endeavor to enhance the well-being and health of lower-class learners.

Materials and Methods

Participants.

The study population consisted of third-grade students from both reputable school groups and regular schools in the urban schools of Elementary School Mujahidin and Elementary School 16 Rasau Jaya, reflecting diverse social statuses. Purposive sampling was used to select the sample so that 40 students were obtained, namely 20 students of Mujahidin Elementary School and 20 students of Elementary School 16 Rasau Jaya.

Research Design.

The design of this study was to compare physical fitness levels in different social circles. This research is descriptive quantitative with data collection techniques using tests and measurements.

Descriptive research is research that describes or shows an event that takes place at the time of the research (Rubiyatno et al., 2022).

The technique used in this study is the test and measurement of the Indonesian Physical Fitness Test (TKJI) in the form of several test items, namely vertical jump using a wall, wooden ruler and chalk, sit ups using a stopwatch, hanging elbow bend (pull-up) using a pull-up bar, 30 meter sprint and 600 meter run stopwatch, This study aims to determine the comparison of physical fitness levels in low grade elementary school students in all social status circles.

Statistical analysis.

Data analysis using quantitative descriptive analysis. Data analysis in this study also used normality, homogeneity and t tests. This physical fitness category must add up all the values of the five test items listed and then match them with the 5 tests above. Then the test results that have been converted in the norm of categorization are descriptive analysis through percentage. Data analysis is assisted using the SPSS 26 application.

Results

This research on the physical fitness of elementary school students at Mujahidin and SDN 16 Rasau Jaya, can be seen in the following table:

Table 1. Physical Fitness Results of Mujahidin Elementary School

Value	Classification	Frequency	Percentage
22 – 25	Very good	0	0 %
18 – 21	Good	2	10 %
14 – 17	Fair	12	60 %
10 – 13	Poor	6	30 %
5 – 9	Very poor	0	0 %
	Total	20	100 %

According to the data in the table above, the descriptive percentage results in the Indonesian physical fitness test for mujahidin students are 2 students in the good category with a percentage of 10%, 12 students in the moderate category with a percentage of 60%, and 6 students in the less category with a percentage of 30%. Based on these findings, it can be inferred that mujahidin elementary school kids have a modest degree of physical fitness. The results can be seen in table 1.

Table 2. Physical Fitness Test Results of State Elementary School 16 Rasau Jaya

Value	Classification	Frequency	Percentage
22 – 25	Very good	0	0 %
18 – 21	Good	0	0 %
14 – 17	Fair	14	70 %
10 – 13	Poor	6	30 %
5 – 9	Very poor	0	0 %
	Total	20	100 %

According to the data in the table above, the descriptive percentage results in the Indonesian physical fitness test of 16 Rasau Jaya public elementary school students are 14 in the moderate category with a percentage of 70%, and 6 in the less category with a percentage of 30%. Based on these findings, it can be concluded that the physical fitness level of Elementary School 16 Rasau Jaya students is moderate. The results can be seen in table 2.

Based on the results in table 3, the normality test with Shapiro-Wilk shows a significance value ($p > 0.05$) which means that the data is normally distributed so that it can be continued using the t test. Furthermore, the data from the homogeneity test results have a significance of $0.208 > 0.05$, it can be said that the data is homogeneous. The results can be seen in table 4.

e-ISSN:2988-4942

The results of the independent sample test show a significance value of 0.538 > 0.05 based on these results it can be concluded that there is no significant difference in physical fitness in students of Elementary School 16 Rasau Jaya and Mujahidin. These results also provide evidence that physical fitness based on parental social status shows no difference. This result can be seen in table 5.

Table 3. Shapiro-Wilk Test

Group		Statistic	df	Sig.
Physical Fitness	Elementary School 16 Rasau Jaya	0,852	20	0,056
	Elementary School Mujahidin	0,939	20	0,227

Table 4. Homogeneity Test

Result		Levene Statistic	df1	df2	Sig.
Physical Fitness	Based on Mean	1,637	1	38	0,208
	Based on Median	0,917	1	38	0,344
	Based on Median and with adjusted df	0,917	1	36,339	0,345
	Based on trimmed mean	1,358	1	38	0,251

Table 5. Independent Samples Test

Result	Variants	F	Sig.	t	df	Sig. (2-tailed)
Physical Fitness	Equal variances assumed	1,637	0,208	-0,622	38	0,538
	Equal variances not assumed			-0,622	36,289	0,538

The results in table 6 provide information that the mean value of Mujahidin Elementary School (14.90) is greater than Elementary School 16 Rasau Jaya (14.45). However, it should also be understood that this difference is not much, so these results can also provide information in the same category.

Table 6. Descriptive Results of Physical Fitness

Results	N	Mean	Std. Deviation	Upper Bound	Minimum	Maximum
Elementary School 16 Rasau Jaya	20	14,4500	2,52305	15,6308	10,00	17,00
Elementary School Mujahidin	20	14,9000	2,02355	15,8470	12,00	20,00
Total	40	14,6750	2,26894	15,4006	10,00	20,00

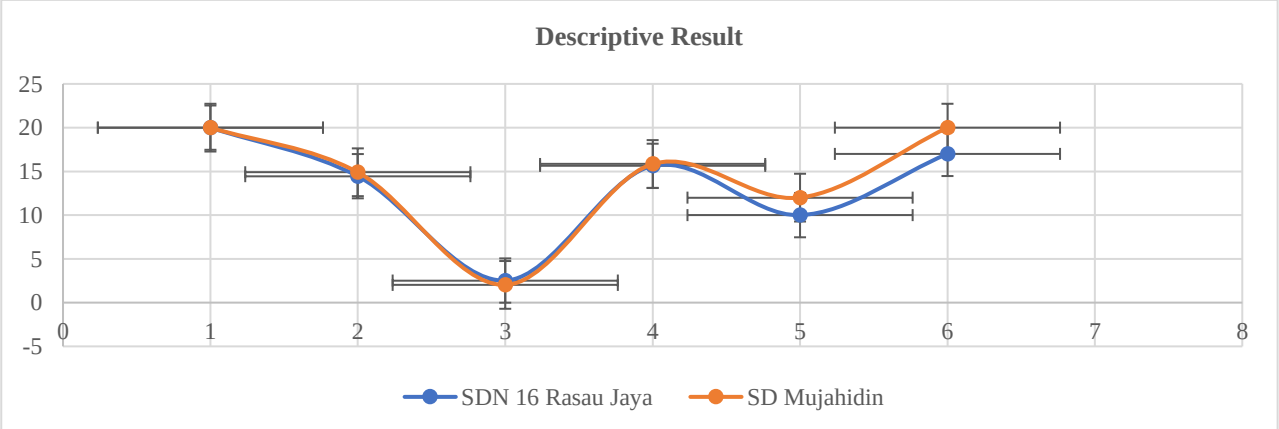

Figure 1. Descriptive Results of Elementary School 16 Rasau Jaya and Mujahidin

Discussion

This study aims to determine differences in physical fitness in elementary school students based on parental social status. The findings indicated that the average score for Mujahidin Elementary School was 14.90, and for Elementary School 16 Rasau Jaya, it was 14.45. However, it is essential to note that the difference is not substantial. The t-test results also demonstrate that there is no statistically significant difference. In addition, both research results show the same physical fitness which is in the fair category. These results are different from previous studies which found that students' physical fitness was still in the low category (Pratiwi et al., 2020). Therefore, it is necessary to design the right exercise program so that physical fitness increases.

Several studies provide evidence that physical fitness can be improved through gymnastics (Elysa Agustika et al., 2021; Fitri et al., 2020; Gunawan et al., 2015; Sujoko & Saputra, 2021). Various benefits of sports activities can be applied to improve fitness (Chen et al., 2018; Cocca et al., 2020; Kljajević et al., 2022). Elementary school students have high activity in daily life so that physical fitness is very useful, physical fitness at the age of elementary school children greatly supports the development of children so that good physical fitness is needed so that the physical condition of children remains stable and maintained (Rivai et al., 2022). Physical fitness is one component of physical condition so that if training is done from elementary school age it will be better for future achievements (Aprilianto & Fahrizqi, 2020).

A study says poor physical fitness is influenced by several factors including the environment, nutrition, facilities and infrastructure and knowledge (Jamaluddin1 & Dan, 2022). In addition, the role of sports teachers in schools is very important to help support the achievement of students' physical fitness (Mashud et al., 2024). In addition, facilities and infrastructure at school greatly influence the success of physical fitness (Faishal Arindra Yahya et al., 2023). Physical education sports and health is one of the subjects in the elementary school curriculum, with this learning aiming to improve physical, mental, emotional development with efforts to achieve a healthy life (Fitriady et al., 2020; Sastro Desmianto Ginting, 2022).

Research conducted by Armen, (2017) states in his research that in everyday life the motion of running, jumping that exists in physical fitness seems to describe a person's vibrant, happy, and creative life. In other words, a fit person is one who can create his work positively in the future (Griban et al., 2020). Physical fitness is very important for someone to have, especially during elementary school because it is still in its growth period (Ananda & Amra, 2023).

Furthermore, good physical fitness will increase concentration and the emergence of creative and innovative ideas and when doing daily activities without feeling excessive fatigue (Singingi et al., 2017). Based on some of the previous research above, physical fitness is very important for someone to have in order to produce positive things. After conducting physical fitness research at State Elementary School 16 Rasau Jaya and Mujahidin Elementary School, there were no differences in physical fitness based on the social status of parents.

Conclusion

Through a comparative study based on social status, it can be concluded that the analysis of physical fitness in university students does not show significant differences between groups with different social status. Although there were variations in the physical fitness data, the differences did not reach the level of statistical significance. These results indicate that social status factors, which include economic and educational backgrounds, did not significantly affect the physical fitness levels of the university students who were the subjects of the study. Nonetheless, it is important to note that physical fitness remains an important aspect of monitoring and coaching students' health regardless of differences in social status. This study can serve as a basis for the implementation of physical fitness programs on campus that are inclusive and accessible to students from various social backgrounds. Further implications involve the need for a holistic approach in improving the well-

e-ISSN:2988-4942

being and physical fitness of university students, without leaving out groups with a certain social status.

Acknowledgments

The researchers express their gratitude to Mujahidin Elementary School and State Elementary School 16 Rasau Jaya. Special appreciation goes to the teachers and students involved in sports who willingly participated in this study until its completion.

Conflict of Interest And Funding

There is no conflict of interest.

References

Ananda, D., & Amra, F. (2023). Tinjauan Tingkat Kebugaran Jasmani Siswa Sekolah Dasar Negeri 29 Batang Anai. *Jurnal Pendidikan Dan Olahraga*, *6*(1), 86–91. http://jpdo.ppj.unp.ac.id/index.php/jpdo/article/view/1242

Aprilianto, M. V., & Fahrizqi, E. B. (2020). Tingkat kebugaran jasmani anggota ukm futsal universitas teknokrat indonesia. *Journal Of Physical Education*, *1*(1), 1–9. https://doi.org/10.33365/joupe.v1i1.122

Armen, M. (2017). Perbedaan Tingkat Kesegaran Jasmani Siswa SD Negeri 13 Muara Siberut Dengan Siswa SD Negeri 06 Rogdog Kecamatan Siberut Selatan. *Journal Physical Education, Health and Recreation*, *2*(1), 7. https://doi.org/10.24114/pjkr.v2i1.7835

Candra, H., Alnedral, A., Gusril, G., Emral, E., Nirwandi, N., & Zarya, F. (2023). The Effect of the Project Based Learning Model with the Case Method and Nutritional Status on Physical Fitness of Learners Class Vii Smpn 21 Padang. *International Journal of Multidisciplinary Research and Analysis*, *6*(4), 1332–1342. https://doi.org/10.47191/ijmra/v6-i4-02

Chen, W., Hammond-Bennett, A., Hypnar, A., & Mason, S. (2018). Health-related physical fitness and physical activity in elementary school students. *BMC Public Health*. https://doi.org/10.1186/s12889-018-5107-4

Cocca, A., Verdugo, F. E., Cuenca, L. T. R., & Cocca, M. (2020). Effect of a game-based physical education program on physical fitness and mental health in elementary school children. *International Journal of Environmental Research and Public Health*. https://doi.org/10.3390/ijerph17134883

Diamond, A. B. (2015). The Cognitive Benefits of Exercise in Youth. *Current Sports Medicine Reports*, *14*(4), 320–326. https://doi.org/10.1249/JSR.0000000000000169

Elysa Agustika, Karlina Dwijayanti, & Slamet Santoso. (2021). Perbedaan Pengaruh Senam Aerobik Low Impact dan Zumba Fitness Terhadap Kebugaran Jasmani Pada Ibu – ibu Usia 25 – 35 tahun Desa Bulupayung Kabupaten Cilacap. *JURNAL ILMIAH PENJAS (Penelitian, Pendidikan Dan Pengajaran)*. https://doi.org/10.36728/jip.v7i1.1384

Ernawati, F., Pusparini, P., Arifin, A. Y., & Prihatini, M. (2019). Hubungan Asupan Lemak Dengan Status Gizi Anak Usia 6 Bulan-12 Tahun Di Indonesia. *Penelitian Gizi Dan Makanan (The Journal of Nutrition and Food Research)*, *42*(1), 41–47. https://doi.org/10.22435/pgm.v42i1.2420

Faishal Arindra Yahya, Agustanico Dwi Muryadi, & Satrio Sakti Rumpoko. (2023). Survei Tingkat Kebugaran Jasmani (Tkji) Siswa Sd Negeri 1 Conto Bulukerto Wonogiri Tahun 2022. *Penjas (Penelitian, Pengabdian, Pengajaran)*, *9*(1), 106–119.

Fitri, M., Rahmi, U., Pitriani, P., & Sulastri, A. (2020). Efektivitas senam vitalisasi otak terhadap kebugaran jasmani pada lansia demensia. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*. https://doi.org/10.29407/js_unpgri.v6i2.14360

Fitriady, G., Sugiyanto, & Sugiarto, T. (2020). Gelanggang Pendidikan Jasmani Indonesia.

Gelanggang Pendidikan Jasmani Indonesia, *3*(2), 82–90.

Garzia, M., Yufiarti, Y., & Hartati, S. (2019). Perbedaan Kesiapan Sekolah Anak Usia Dini di Daerah Pesisir Ditinjau dari Status Ekonomi Orang Tua dan Parenting. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *3*(2), 470. https://doi.org/10.31004/obsesi.v3i2.239

Goodyear, V. A., Armour, K. M., & Wood, H. (2019). Young people and their engagement with health-related social media: new perspectives. *Sport, Education and Society*, *24*(7), 673–688. https://doi.org/10.1080/13573322.2017.1423464

Griban, G., Kobernyk, O., Petrachkov, O., Dmytrenko, S., Khurtenko, O., Kostiuk, Y., Nazarenko, L., Kostenko, M., Khotentseva, O., Korol, S., Shpychka, T., Stepaniuk, V., Savchenko, L., & Bloshchynskyi, I. (2020). Physical Fitness Level of Students of Higher Educational Institutions from a Historical Perspective. *INTERNATIONAL JOURNAL OF APPLIED EXERCISE PHYSIOLOGY*.

Gunawan, A., Polii, H., & Pengemanan, D. H. C. (2015). Pengaruh senam zumba terhadap kebugaran kardiorespiratori pada mahasiswa fakultas kedokteran universitas sam ratulangi angkatan 2014. *Jurnal E-Biomedik*, *3*(1), 48–52. https://doi.org/10.35790/ebm.3.1.2015.6605

Kljajević, V., Stanković, M., Đorđević, D., Trkulja-Petković, D., Jovanović, R., Plazibat, K., Oršolić, M., Čurić, M., & Sporiš, G. (2022). Physical activity and physical fitness among university students—A systematic review. In *International Journal of Environmental Research and Public Health* (Vol. 19, Issue 1). https://doi.org/10.3390/ijerph19010158

Limanskaya, O. V., Kriventsova, I. V., Podrigalo, L. V., Yefimova, O. V., & Jagiello, M. (2020). The influence of professional training disciplines on the physical fitness level of the folk dance department students. *Pedagogy of Physical Culture and Sports*. https://doi.org/10.15561/26649837.2020.0505

Mashud, M., Arifin, S., Warni, H., Samodra, Y. T. J., Yosika, G. F., Basuki, S., Suryadi, D., & Suyudi, I. (2024). Physical Fitness: Effects of active lifestyle internalization through physical literacy awarenes based project. *Retos*, *51*, 1299–1308. https://doi.org/10.47197/retos.v51.101662

Nurcahyo, F. (2015). Kaitan antara obesitas dan aktivitas fisik. *MEDIKORA*, *7*(1). https://doi.org/10.21831/medikora.v0i1.4663

Olahraga, J., & Dan, K. (2022). *Jurnal olahraga kebugaran dan rehabilitasi*. *2*(2016), 85–92.

Pratiwi, F., Kalola, C. N., & Syamsudin. (2020). *Vol. 03 No. 01 Tahun 2020 Musamus Journal of Physical Education and Sport (MJPES)*. *03*(01), 31–39. https://doi.org/10.35724/mjpes.v5i02.5141

Rachmi, C. N., Hunter, C. L., Li, M., & Baur, L. A. (2017). Perceptions of overweight by primary carers (mothers/grandmothers) of under five and elementary school-aged children in Bandung, Indonesia: A qualitative study. *International Journal of Behavioral Nutrition and Physical Activity*, *14*, 101. https://doi.org/10.1186/s12966-017-0556-1

Rivai, T. M., Nugraheni, W., & Septiadi, F. (2022). Kebugaran Jasmani dan Self-Regulated Learning: Kondisi Siswa Sekolah Dasar Pada Masa Adaptasi Kebiasaan Baru. *Jurnal Educatio*, *8*(4), 1335–1341. https://doi.org/10.31949/educatio.v8i4.3528

Rodrigues, D., Padez, C., & Machado-Rodrigues, A. M. (2019). Parental perception of barriers to children's participation in sports: Biological, social, and geographic correlates of Portuguese children. *Journal of Physical Activity and Health*, *16*(8), 595–600. https://doi.org/10.1123/jpah.2018-0390

Rohmatin, T., & Wulan, B. R. S. (2019). Kemampuan motorik kasar anak sekolah dasar berdasarkan perbedaan status ekonomi keluarga. *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, *9*(2), 172–180.

Rubiyatno, R., Supriatna, E., & Perdana, R. P. (2022). Profile Of Physical Fitness Basketball Student Extracurricular. *Kinestetik : Jurnal Ilmiah Pendidikan Jasmani*, *6*(1), 79–87. https://doi.org/10.33369/jk.v6i1.20231

Sastro Desmianto Ginting. (2022). Tingkat Kebugaran Jasmani Dan Motivasi Belajar Siswa Sekolah

Dasar Negeri Di Desa Bayat Kecamatan Belantikan Raya. *Jurnal Kejaora (Kesehatan Jasmani Dan Olah Raga)*, *7*(2), 172–183. https://doi.org/10.36526/kejaora.v7i2.2155

Singingi, K. K., Silang, R., Kuantan, K., Kabupaten, M., Singingi, K., Kecamatan, S., Mudik, K., & Kuantan, K. (2017). *Perbedaan Tingkat Kesegaran Jasmani Siswa Rantau Silang Kecamatan*. *3*(3), 595–604.

Sujoko, I., & Saputra, R. (2021). Pengaruh Latihan Senam Ayo Bersatu Terhadap Peningkatan Kebugaran Jasmani Mahasiswi Akbid Wahana Husada. *Riyadhoh : Jurnal Pendidikan Olahraga*. https://doi.org/10.31602/rjpo.v4i2.5936

Utesch, T., Dreiskämper, D., Strauss, B., & Naul, R. (2018). The development of the physical fitness construct across childhood. *Scandinavian Journal of Medicine and Science in Sports*, *28*(1), 212–219. https://doi.org/10.1111/sms.12889

Information about the authors:

Haura Athaya; hauraathaya22@student.untan.ac.id; Department of Sports Coaching Education, Faculty of Teacher Training and Education, Universitas Tanjungpura; Pontianak, Indonesia

Julian Dewantara; juliandewantara.2023@student.uny.ac.id; Department of Sports Science, Faculty of Sports and Health Science, Universitas Negeri Yogyakarta; Yogyakarta, Indonesia

Muhamad Husein; muhamadhusein.2023@student.uny.ac.id; Department of Sports Science, Faculty of Sports and Health Science, Universitas Negeri Yogyakarta; Yogyakarta, Indonesia

Redha Taiar; https://orcid.org/0000-0002-0227-3884; redha.taiar@univ-reims.fr; Department of Physical and Sports Education, Reims University; Reims, France

Manish Shukla; https://orcid.org/0000-0002-3568-8496; manish.shukla1992@gmail.com; Department of Physical Education, Agra College; Agra, India

Nor Fazila Abd Malek; https://orcid.org/0000-0001-8998-228X; fazila.malek@fsskj.upsi.edu.my; Department of Sports Science and Coaching, Sultan Idris Education University, Malaysia

Tanjungpura Journal of
Coaching Research
Tanjungpura Journal of Coaching Research 2023: 1(3): 79-85
https://jurnal.untan.ac.id/index.php/TAJOR/index

Original Research

Application of speed and agility training: How do they affect dribbling skills in football?

Reyhan Chafidz[1ACD]*, Candra Juli[1BE], Faridatul 'Ala[1DE], Mariya Troyanovska[2E]
[1]*Department of Sport Coaching Education, Universitas Bhayangkara, Bekasi, Indonesia*
[2]*Department of Pedagogy, Taras Shevchenko National University of Kyiv, Ukraine*
**Coresponding Author: chafidz.reyhan18@mhs.ubharajaya.ac.id*

Authors' contribution:
A. Conception and design of the study; B. Acquisition of data; C. Analysis and interpretation of data; D. Manuscript preparation; E. Obtaining funding

How Cite: Chafidz, R., Juli, C., 'Ala, F., & Troyanovska, M. (2023). Application of speed and agility training: How do they affect dribbling skills in soccer? *Tanjungpura Journal of Coaching Research, 1*(3).79-85 https://doi.org/10.26418/tajor.v1i3.69561

Abstract

Background and Study Aim. Dribbling skills have a crucial role in the achievement of a football player, especially at a young age level such as the SSB Medan Satria U-16 Football team. This study aims to investigate the effect of speed and agility on the dribbling skills of SSB U-16 Medan Satria students.

Material and Methods. The method used in this research is experimental, the data collection techniques used are tests and measurements. The population in this study were SSB U-16 Medan Satria students. The sample taken from the results of purposive sampling amounted to 20 students. The instrument used is a dribbling skill test. Data analysis using the SPSS 26 application.

Results. The results showed a significance value of 0.000 <0.05 so there is a significant effect of speed training on dribbling skills of soccer games. The application of agility training shows a significance value of 0.000 <0.05 so that there is a significant effect of agility training on dribbling skills of soccer games. Further results show the comparison between speed training and agility training shows a significance value of 0.000 <0.05 which means that there is a significant difference between speed training and agility training, the results also provide information that speed training is better for improving dribbling skills.

Conclusions. The results of this study are expected to provide a clear picture of the effect of speed and agility training on dribbling skills at the youth level. These findings can then be applied in the development of a more specific and focused training program, with the aim of improving the quality of each player's dribbling skills.

Article History
Received: 28.08.2023
Accepted: 19.10.2023
Published: 31.11.2023

Keywords
Speed Training_1;
Agility Training_2;
Dribbling Skills_3;
Football_3;

Introduction

The global history of soccer spans a considerable length (Villaseca-Vicuña, Jesam-Sarquis, et al., 2021). The origins of ball games akin to soccer can be traced back to ancient China during the Han Dynasty, approximately between 1122-247 BC (Abdulsalam et al., 2022). Historical records reveal depictions of people engaging in a form of soccer called "Tsu Chiu" in a book from the Chinese military of that era (Leite Junior & Rodrigues, 2020). The term "Tsu Chiu" translates to foot and ball,

e-ISSN:2988-4942

referring to a leather ball filled with grass. Soccer has evolved into one of the most beloved sports globally, evident in the participation of 211 countries affiliated with FIFA (Federation International Football Association) (Gomtsian et al., 2017).

Present-day soccer has witnessed substantial advancements, transformations, and rapid progress encompassing physical fitness, playing techniques, strategic approaches, and the psychological aspects of players (González & Sánchez, 2018; Herly et al., 2022). This evolution is readily observable in live broadcasts of European cup matches and world cup qualifiers featuring European and Latin American teams (Conde-Pipo et al., 2023). The contemporary game emphasizes swift gameplay, refined techniques, exceptional individual skills, robust physical fitness, and artistic movements (Hardinata et al., 2023; Villaseca-Vicuña, Molina-Sotomayor, et al., 2021). The quick-paced play, technical finesse, and physical prowess demonstrated in these matches serve as benchmarks that Indonesian soccer can strive to emulate for its progression and robust development.

In the realm of soccer, dribbling transcends being a mere fundamental skill; it is an art that demands optimal speed and agility (Karo Karo et al., 2020; Ramirez-Campillo et al., 2021). Gaining a deeper comprehension of how specific exercises impact dribbling ability can yield valuable insights for coaches, players, and the formulation of soccer training programs (Doewes et al., 2020). This study zeroes in on factors such as speed and agility, given their pivotal role in determining a player's proficiency in mastering dribbling techniques (Karo Karo et al., 2020). Speed and agility can be concurrently honed, both with and without the ball. Soccer players constantly encounter diverse situations in every match, aspiring to execute graceful and rapid movements often infused with elements of speed and agility.

The primary aim of this research is to investigate the direct influence of speed and agility training on soccer dribbling skills. By unraveling this relationship, more tailored training programs can be devised to enhance effectiveness in outmaneuvering opponents and maintaining control of the ball (Crossley et al., 2020; Otte et al., 2020). This study seeks to analyze the impact of implementing speed and agility training on the development of dribbling skills in football. By adopting a holistic approach to these aspects, the study aspires to furnish concrete guidelines for players' skill development in navigating dynamic game situations.

The significance of this research lies in contributing to the scientific understanding of how speed and agility training can influence pivotal skills in soccer. Through an exploration of their impact, coaches and players can fine-tune their training regimens to place a greater emphasis on those aspects proven to have a substantial effect (Alficandra et al., 2021). By approaching this research comprehensively, it is anticipated that findings will emerge, opening avenues for the creation of more effective and efficient training methodologies. Furthermore, this research is poised to make a meaningful contribution to sports literature, serving as a crucial reference in the advancement of soccer player skills, particularly in the context of dribbling, which stands as a central element in the dynamics of the game.

Materials and Methods

Participants.

The population in this study was conducted by involving SSB U-16 Medan Satria students. Given the situation and conditions of a pandemic like this, it is not possible for school children to do it. The sampling technique used purposive sampling so that only about 20 children were obtained to be given treatment.

Research Design.

The research methodology employed in this investigation is an experimental approach that involves a comparison between two physical conditioning exercises: speed training and agility training, both of which target dribbling skills. The rationale behind selecting this research method is the researchers' desire to obtain precise results by conducting several tests, including a pretest (prior to the treatment) and a posttest (following the treatment).

The primary objective of this study is to assess the efficacy and outcomes of the administered treatment. The treatment regimen encompassed 60-meter sprint training and 40-meter shuttle run training conducted three times a week over a span of 6 weeks. The research instrument utilized for evaluation was the Loughborough Soccer Dribbling Test, which is in line with prior research (Kirkendall et al., 2008).

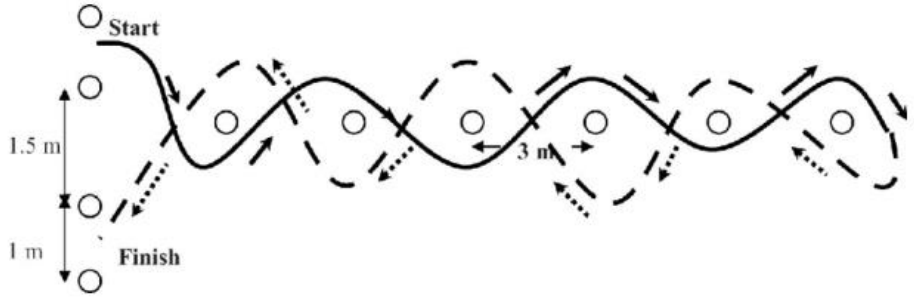

Figure 1. Loughborough Soccer Dribbling Test

Statistical analysis.

The data obtained were analyzed statistically through the stages of normality test, homogeneity test, and hypothesis testing. Data analysis was assisted using the SPSS 26 application.

Results

The implementation of speed training and agility training has a positive impact on students from SSB U-16 Medan Satria. In this study, the researchers aimed to attain precise outcomes through a series of tests, including the pretest (before the treatment) and the posttest (after the treatment). To assess the effects imparted, the initial step involved a prerequisite test stage to establish the hypothesis test to be used. According to the outcomes presented in Table 1, the Shapiro-Wilk normality test indicates a significance value ($p > 0.05$), signifying the normal distribution of the data.

Subsequently, the data from the speed training on soccer dribbling exhibited a significance value of $0.000 < 0.05$. These findings substantiate that speed training significantly influences dribbling skills. Similarly, the results from agility training on soccer dribbling also displayed a significance value of $0.000 < 0.05$, providing evidence that agility training significantly affects dribbling skills. These findings collectively indicate that both speed and agility exercises have a discernible impact on soccer dribbling skills, making them applicable contributions to soccer games. The detailed results are presented in Table 2.

Table 1. Normality Test Results

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Speed Training	0,133	10	.200*	0,955	10	0,723
Posttest Speed Training	0,183	10	.200*	0,936	10	0,507
Pretest Agility Training	0,220	10	0,188	0,864	10	0,084
Posttest Agility Training	0,170	10	.200*	0,963	10	0,821

Table 2. Paired Sample Test Results

	Result	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pretest Speed Training - Posttest Speed Training	0,46096	0,89704	7,045	9	0,000
Pair 2	Pretest Agility Training - Posttest Agility Training	0,57239	1,05561	7,621	9	0,000

e-ISSN:2988-4942

Based on the results of the homogeneity test, it provides information on the significance value of 0.780> 0.05 where these results indicate that the data is homogeneous. After obtaining the same results, it can be continued using a different test to see the difference in the effect given. The results are shown in table 3.

The results in table 5 use Independent sample test to see the difference in the effect of speed and agility training on dribbling ability in soccer games. The results show a significance value of 0.000 <0.05 which means there is a significant difference between speed training and agility on dribbling skills. These results provide information that speed training provides a better effect than agility training. This result can be seen based on the mean value using speed training (15.72) while the mean value of agility training (18.30). The results can be seen in table 5 and figure 2.

Table 3. Homogeneity Test of Dribling Ability

Homogenity Test		Levene Statistic	df1	df2	Sig.
Result dribbling skills	Based on Mean	.080	1	18	.780
	Based on Median	.042	1	18	.840
	Based with adjusted df	.042	1	17.127	.841
	Based on trimmed mean	.058	1	18	.813

Table 4. Differential Test Results of Speed Training with Agility Training

Result		F	Sig.	t	df	Sig. (2-tailed)
Result dribbling skills	Equal variances assumed	0,080	0,780	-7,938	18	0,000
	Equal variances not assumed			-7,938	17,720	0,000

Table 5. Descriptive Results of Speed Training with Agility Training

Result	N	Mean	Std. Deviation	Minimum	Maximum
Speed Training	10	15,7220	0,68086	14,82	16,91
Agility Training	10	18,3070	0,77266	17,24	19,80
Total	20	17,0145	1,50361	14,82	19,80

Figure 2. Descriptive Results of Dribling Skills with Speed and Agility Training

Discussion

This study aims to investigate the effect of speed and agility on dribbling skills in soccer. Results showed that speed training and agility training had a significant impact on dribbling skills in soccer. However, the results also provided additional evidence that speed training had a better effect than agility training. Through exercises focused on increasing running speed, a player can develop the ability to pass their opponents quickly. Execution speed while dribbling not only increases physical explosiveness, but also allows players to respond more efficiently to game situations (Wilson et al., 2020).

Agility training, such as drills and exercises that emphasize movement around the ball, plays an important role in improving dribbling ability. Good agility allows players to quickly change direction, trick opponents, and maintain control of the ball even in crowded situations (Moselhy, 2020). Oleh Therefore, players who undergo agility training regularly have the ability to overcome opponent pressure and retain the ball more effectively. A study provides evidence that agility and balance training has a significant effect on the success of dribbling speed (Yusuf et al., 2022).

Optimal dribbling skills in soccer often involve a combination of speed and agility (Padrón-Cabo et al., 2020). This statement is in line with the results of research showing that speed training and agility training contribute to the success of soccer dribbling. The application of exercises that combine these aspects can produce more complete players (Pambudi Rilo et al., 2021). Drills that emphasize short sprints, quick direction changes, and agility maneuvers around the ball are examples of exercises that can provide a thorough understanding of how to dribble effectively.

In addition to physical aspects, speed and agility training also contributes to improving players' ability to make decisions quickly (Wilson et al., 2020). Players who can move quickly and agilely have an advantage in choosing the best option when facing certain situations in the game. It is important to note that the implementation of speed and agility drills should be an integral part of a regular training program. These exercises can be adapted to meet the specific needs of players and positions within the team. Consistency in engaging these drills will ensure continued development in dribbling skills.

The greater the speed of a person, the faster the dribbling results, conversely the slower the speed of a person, the slower the dribbling results. Speed is one of the important factors that can affect movement. Speed is not only moving the whole body quickly, but can also be limited to moving the whole body in a short time. Speed can be seen in many activities in sports such as efficient footwork and rapid changes in body position. Someone who can move with fast and precise coordination means they have good speed which affects the results of dribbling skills.

Conclusion

The implementation of speed and agility drills in football training programs can significantly improve players' dribbling skills. By strengthening both physical and mental aspects, players can become more reliable in responding to game situations and maintaining control of the ball. Therefore, this training is key in shaping soccer players who are comprehensive and effective in real games. It is important to include speed and agility training in a regular training program to ensure continued development in dribbling skills. Improved dribbling skills at an individual level can also contribute positively to overall team performance, especially in terms of maintaining control of the ball and creating goal opportunities. Future research recommendations can combine with other variables so that they can influence the results of the study.

Acknowledgments

We would like to thank SSB Medan Satria U-16. We hope these results can be used as evaluation material for various researchers.

e-ISSN:2988-4942

Conflict of Interest And Funding

There is no conflict of interest.

References

Abdulsalam, Z. S., Abdulameer, W. H., & Hamza, J. S. (2022). Analysis of the history of ball sports. *Sport TK*, *10*(10). https://doi.org/10.6018/sportk.535351

Alficandra, Tandiyo, R., Handayani, O., Setyawati, H., & Bola, K. (2021). Effect of Quiet Eye Exercises, Anxiety Levels , Eye-Foot Coordination on the Accuracy of Kicks against Football Players. *Sports Engineering*, *48*(7).

Conde-Pipo, J., Latorre, J. A., Gimenez-Blasi, N., Olea-Serrano, F., Requena, B., & Mariscal-Arcas, M. (2023). Comparative Analysis of Body Composition Profiles among Latin American Elite Football Players Competing in Europe. *Applied Sciences (Switzerland)*, *13*(11), 67–78. https://doi.org/10.3390/app13116778

Crossley, K. M., Patterson, B. E., Culvenor, A. G., Bruder, A. M., Mosler, A. B., & Mentiplay, B. F. (2020). Making football safer for women: A systematic review and meta-Analysis of injury prevention programmes in 11 773 female football (soccer) players. In *British Journal of Sports Medicine*. https://doi.org/10.1136/bjsports-2019-101587

Doewes, R. I., Purnama, S., Syaifullah, R., & Nuryadin, I. (2020). The effect of small sided games training method on football basic skills of dribbling and passing in indonesian players aged 10-12 years. *International Journal of Advanced Science and Technology*, *29*(3), 429–441. http://sersc.org/journals/index.php/IJAST/article/view/5620

Gomtsian, S., Balvert, A., Hock, B., & Kirman, O. (2017). Between the Green Pitch and the Red Tape: The Private Legal Order of FIFA. *SSRN Electronic Journal*, *43*, 85. https://doi.org/10.2139/ssrn.2903902

González, J. R., & Sánchez, J. S. (2018). Strength training methods for improving actions in football. *Apunts. Educacion Fisica y Deportes*, *34*(132), 73–93. https://doi.org/10.5672/apunts.2014-0983.es.(2018/2).132.06

Hardinata, R., B, P. S., Okilanda, A., Tjahyanto, T., Prabowo, T. A., Rozi, M. F., Suganda, M. A., & Suryadi, D. (2023). Analysis of the physical condition of soccer athletes through the yo-yo test: a survey study on preparation for the provincial sports week. *Retos*, *50*, 1091–1097. https://doi.org/10.47197/retos.v50.100300

Herly, H., Ramadi, R., Vai, A., & Gusdernawati, A. (2022). Pengaruh latihan twisted bicycle crunch terhadap daya tahan otot perut atlet sepak bola. *Sepakbola*, *2*(1), 35. https://doi.org/10.33292/sepakbola.v2i1.174

Karo Karo, A. A. P., M, B. A., Sari, I. E. P., Sihombing, H., & Sari, L. P. (2020). Effect of playing methods on the Dribble Ability of the Football Game. *Kinestetik : Jurnal Ilmiah Pendidikan Jasmani*, *4*(2), 158–163. https://doi.org/10.33369/jk.v4i2.12566

Kirkendall, D. T., Leiper, J. B., Bartagi, Z., Dvorak, J., & Zerguini, Y. (2008). The influence of Ramadan on physical performance measures in young Muslim footballers. *Journal of Sports Sciences*, *26*(3), S15-27. https://doi.org/10.1080/02640410802422199

Leite Junior, E., & Rodrigues, C. (2020). Belt, road and ball: Football as a chinese soft power and public diplomacy tool. In *The Belt and Road Initiative: An Old Archetype of a New Development Model* (pp. 61–83). https://doi.org/10.1007/978-981-15-2564-3_4

Moselhy, S. (2020). Effect of Speed, Agility, and Quickness (SAQ) training with and without Ball on All Types of Dribble Skill for Junior Female Basketball players. *The International Scientific Journal of Physical Education and Sport Sciences*, *8*(1), 171–184. https://doi.org/10.21608/isjpes.2020.21732.1001

Otte, F. W., Millar, S. K., & Klatt, S. (2020). How does the modern football goalkeeper train?–An exploration of expert goalkeeper coaches' skill training approaches. *Journal of Sports Sciences*,

38(11–12), 1465–1473. https://doi.org/10.1080/02640414.2019.1643202

Padrón-Cabo, A., Rey, E., Kalén, A., & Costa, P. B. (2020). Effects of Training with an Agility Ladder on Sprint, Agility, and Dribbling Performance in Youth Soccer Players. *Journal of Human Kinetics*, *73*(1), 219–228. https://doi.org/10.2478/hukin-2019-0146

Pambudi Rilo, S., Rahayu, T., & Rumini, R. (2021). The Influence of Training Methods and Agility Towards Futsal Dribbling Speed Result in High School Teams in Blora Regency. *Journal Unnes*, *10*(1), 75–88.

Ramirez-Campillo, R., Gentil, P., Moran, J., Dalbo, V. J., & Scanlan, A. T. (2021). Dribble deficit enables measurement of dribbling speed independent of sprinting speed in collegiate, male, basketball players. *Journal of Strength and Conditioning Research*, *35*(7), 2040–2045. https://doi.org/10.1519/JSC.0000000000003030

Villaseca-Vicuña, R., Jesam-Sarquis, F., Mardones, C., Moreno, C., & Pérez-Contreras, J. (2021). Comparison of physical fitness and anthropometric profiles among Chilean female national football teams from U17 to senior categories. *Journal of Physical Education and Sport*. https://doi.org/10.7752/jpes.2021.s6440

Villaseca-Vicuña, R., Molina-Sotomayor, E., Zabaloy, S., & Gonzalez-Jurado, J. A. (2021). Anthropometric profile and physical fitness performance comparison by game position in the Chile women's senior national football team. *Applied Sciences (Switzerland)*. https://doi.org/10.3390/app11052004

Wilson, R. S., Smith, N. M. A., Melo de Souza, N., & Moura, F. A. (2020). Dribbling speed predicts goal-scoring success in a soccer training game. *Scandinavian Journal of Medicine and Science in Sports*, *30*(11), 2070–2077. https://doi.org/10.1111/sms.13782

Yusuf, M. Z., Rumini, R., & Setyawati, H. (2022). The Effect of Agility and Balance Training on Dribbling Speed in Soccer Games. *Journal of Phisical Education and Sport*, *11*(1), 125–133.

Information about the authors:

Reyhan Chafidz; chafidz.reyhan18@mhs.ubharajaya.ac.id; Department of Sports Coaching Education, Faculty of Education, Universitas Bhayangkara; Bekasi, Indonesia

Candra Juli; juli.candra@dsn.ubharajaya.ac.id; Department of Sports Coaching Education, Faculty of Education, Universitas Bhayangkara; Bekasi, Indonesia

Faridatul 'Ala; faridatul@dsn.ubharajaya.ac.id; Department of Sports Coaching Education, Faculty of Education, Universitas Bhayangkara; Bekasi, Indonesia

Mariya Troyanovska; https://orcid.org/0000-0002-7676-8468; masha.troyanovskaya@gmail.com; Department of Pedagogy, Psychology and Methods of Physical Education, T.H. Shevchenko National University "Chernihiv Colehium"; Chernihiv, Ukraine

Tanjungpura Journal of
Coaching Research
Tanjungpura Journal of Coaching Research 2023: 1(3): 86-93
https://jurnal.untan.ac.id/index.php/TAJOR/index

Original Research

Impact of Pocari and Mineral drinks on pulse rate after running 1200 meters with a 5-minute rest interval

Dede Gunawan[1ABCD]*, Joselito M. Custodio[2AB], John Paul C. Suniga[2DE], Menard Ian Laoan[2BC], Dragutin Stojmenović[3E]

[1]*Department of Sport Coaching Education, Universitas Tanjungpura, Indonesia*
[2]*Department of Physical Education, Mariano Marcos State University,Philippines*
[3]*Department of Physiology, University of Kragujevac, Serbia*
**Coresponding Author: dede221hsm@gmail.com*

Authors' contribution:
A. Conception and design of the study; B. Acquisition of data; C. Analysis and interpretation of data; D. Manuscript preparation; E. Obtaining funding

How Cite: Gunawan, D., Custodio, J. M., Suniga, J. P. C., Laoan, M. I., & Stojmenović, D. (2023). Impact of Pocari and Mineral drinks on pulse rate after running 1200 meters with a 5-minute rest interval. *Tanjungpura Journal of Coaching Research, 1*(3), 86–93. https://doi.org/10.26418/tajor.v1i3.73045

Abstract

Background and Study Aim. Electrolyte drinks are ion replacement drinks in the body that also help as additional energy. Moreover, it is said that this drink is not a drug because it has not been clinically tested so that it is included in the list and also complementary drinks have benefits and side effects for its users, of course, supplement drinks that isotonic drinks affect dehydration and isotonic drinks can normalize body fluids that have been lost during exercise. The purpose of this study was to determine the difference in the usefulness of Pocari and Mineral for fluids in the body after prolonged exercise.
Material and Methods. This research is an experimental method. The population in this study were Tanjungpura University Sports Students Semester 5 with a total of 18 people divided into 2 groups so each group contained 9 people. In this study, the sample was given physical activity treatment through running 1200 meters. Furthermore, Pcoari and Mineral drinks were given to see the effect on pulse rate. Data analysis was assisted using SPSS 26.
Results. The results show a significance value of 0.173 > 0.05 so it can be concluded that the data results of pocari water and mineral water do not experience significant differences. These results provide information that provides the same impact on pulse rate after physical activity. However, the mean value results show that mineral water (162.56) is smaller than pocari drinks (175.00).
Conclusions. This result has important implications, especially for athletes or individuals engaged in similar sports activities. Consumption of mineral-containing isotonic drinks may be an effective strategy in supporting the body's recovery after physical exercise, thereby improving overall sports performance.

Article History
Received: 15.11.2023
Accepted: 18.12.2023
Published: 20.12.2023

Keywords
Pocari_1;
Mineral_2;
Pulse Rate _3;
Physical Activity _4;

Introduction

Electrolyte beverages serve as ion-replacement drinks in the body, also providing an energy boost, whereas plain water is devoid of additional elements. Each energy drink exhibits distinct

effects, and it is essential to note that these drinks are not classified as drugs due to the absence of clinical testing. Supplementary drinks, such as isotonic drinks, offer both benefits and potential side effects for consumers. Isotonic drinks play a role in preventing dehydration and reinstating lost body fluids post-exercise (Palar et al., 2021).

Distinguishing the impact of isotonic drinks and coconut water involves considering factors such as urine color, muscle fatigue reduction, and blood sugar level increase, with variations based on coconut water types (Budiman & Ray, 2021). Combatting fatigue is crucial for sustaining performance, and research indicates that young coconut water is particularly effective in enhancing hydration and performance during competition (Pradana et al., 2022).

While isotonic and electrolyte beverages contribute to reducing dehydration levels, excessive water consumption is discouraged. It is preferable to opt for mineral water in daily hydration routines (Sulastio et al., 2022). Prolonged stress can adversely affect the body by disrupting the aldosterone gland, responsible for regulating fluid and electrolyte levels. Excessive fluid loss due to stress can lead to a lack of focus (Japeri et al., 2022). Additionally, alum in Pocari Sweat can diminish metal content in brackish water and stabilize pH levels.

Color transformation observed from yellowish water to clear brackish water (Damanik et al., 2022). Assessing alum purity derived from used cans, characterizing alum sourced from discarded beverage cans, and confirming alum acidity are crucial steps in understanding its composition (Mulyatun et al., 2022). Emphasizing the significance of water for optimal nutrition and immune system enhancement is highlighted for overall body health (P et al., 2022). The depletion of body fluids during physical exertion can lead to muscle fatigue. Isotonic water serves as a valuable resource to replenish lost fluids, preventing dehydration (Pramono et al., 2014).

Engaging in prolonged physical activities can result in substantial dehydration. In such instances, replenishing body fluids by consuming mineral water, which also possesses isotonic properties, is recommended (Samodra, 2020). Pocari Sweat is suggested as an option for fluid replacement due to its ion content, providing individuals with the necessary stamina for daily activities (Lukman Hakim & Oktavia Monalisa, 2022). Keeping a stock of Pocari drinks at home is advisable for maintaining fluid balance after daily activities (Fadilah et al., 2021). Pocari drinks are specifically designed to prevent dehydration, ensuring individuals remain energetic and less prone to fatigue (Audila & Saraswati, 2021). The accessibility of Pocari in Indonesia is convenient, as it is readily available at nearby stores (Syafikarani et al., 2021).

The electrolyte content in Pocari is intended to replenish body fluids post-sports activities (Wijayanto & Iswari, 2021). However, caution is advised against daily consumption, as the sugar content may contribute to weight gain and pose a risk of diabetes (Purwanto, 2021). Understanding the impact of advertising and brand image on consumer purchasing interest in Pocari Sweat products is a vital consideration (Saraswati & Rahmawati, 2021). This study uniquely explores the effects of mineral water and Pocari on post-exercise pulse rate, contributing valuable insights distinct from studies focusing on variables like overall recovery time, muscle fatigue, or other physiological parameters.

Materials and Methods

Participants.

This research design is divided into 2 groups with different people. The first group gets pocari drinks with a portion of 1 person 1 glass while the second group gets mineral water drinks with the same portion. The population in this study were Tanjungpura University Sports Students Semester 5 with a total of 18 people divided into 2 groups so each group contained 9 people.

Research Design.

This research is an experimental method. In this research, it is a way to reveal a relationship between two or more variables and also to look for the effect of one variable on another. Drinks and

e-ISSN:2988-4942

food are believed to increase or decrease performance. Honey, sugar, pocari, and other beverages are believed to improve or affect performance. This practical will discuss and prove some of these things in sports. This practice will be better if there is a test for lactic acid neutralization in the blood. The test will only focus on pulse rate changes. The procedure is carried out through the stages: (1) The sample performs a 1200-meter run to get the initial data of achievement, (2) Drink each group that can solution, (3) After that the sample again performs a 1200-meter run, (4) The sample is measured the pulse increase of each person, (5) Observed and recorded what happens to people.

Statistical analysis.

The analysis of data in this study is descriptive, namely the results of the data obtained are analyzed using the SPSS version 26 application. Statistical analysis used includes normality test, and hypothesis testing.

Results

This research aims to evaluate the impact of Pocari and mineral water by conducting a 400-meter run with 3 sets and a 5-minute break after each set, followed by pulse rate measurements within the designated sample group.

Based on descriptive calculations of 18 sample data with different values of mineral water and pocari, mean pocari 175, mean mineral water 162.56, median pocari 180, median mineral water 168, mode pocari 162a mode mineral water 168, std. deviation pocari 14.849 std. devation mineral water 12.621, minimum pocari 150 minimum mineral water 138, maximum pocari 192, maximum mineral water 178. These results provide information that the pulse rate using mineral water is smaller than that of pocari drinks. The results can be seen in table 1,2 and figure 1.

Table 1. Pulse Rate Result Data of Pocari and Mineral Drinks

Name	pulse rate	pulse rate
Iqbal	168	169
Agung	186	162
Risky	186	138
Arbain	162	168
Vitra	189	156
Anugrah	162	168
Clara	180	178
Yuriska	150	174
Dinda	192	150

Table 2. Descriptive Results of Pocari Pulse Rate and Mineral Water Pulse Rate

Result		Pocari Pulse	Mineral Pulse
N	Valid	9	9
	Missing	0	0
Mean		175	162,56
Median		180	168
Mode		162[a]	168
Std. Deviation		14,849	12,621
Minimum		150	138
Maximum		192	178

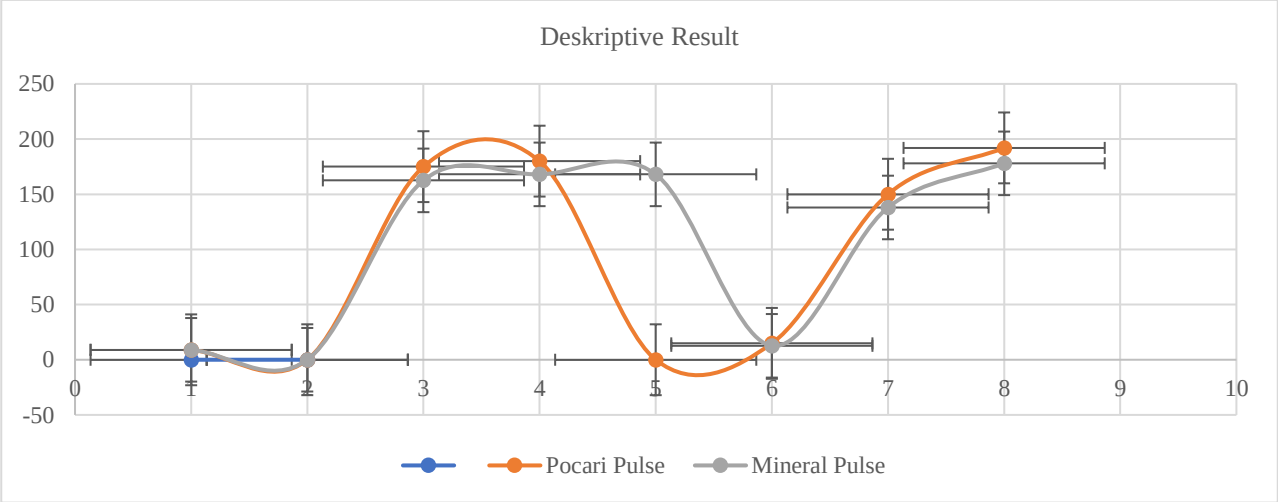

Figure 1. Data of Pocari and Mineral Water

Upon conducting the normality test, it was found that the significance value ($p > 0.05$), indicating that the data is normally distributed. With normal data distribution, further statistical tests can be performed, as shown in Table 3.

The data presented in Table 4 represents the outcomes of an independent sample test with a significance value of 0.173, which is greater than 0.05. Consequently, it can be inferred that there are no significant differences in the results between Pocari water and mineral water. These findings suggest that both beverages have a similar impact on pulse rates after engaging in physical activity. However, when comparing mean values, it is notable that mineral water (162.56) exhibits a smaller value than Pocari drinks (175.00), as indicated in Table 2.

Table 3. Uji normality in the One-Sample Kolmogorov-Smirnov Test

Result		Pocari Pulse	Mineral Pulse
N		9	9
Normal Parameters[a,b]	Mean	175.00	162.56
	Std. Deviation	14.849	12.621
Most Extreme Differences	Absolute	.215	.222
	Positive	.143	.111
	Negative	-.215	-.222
Test Statistic		.215	.222
Asymp. Sig. (2-tailed)		.200[c,d]	.200[c,d]

Table 4. Differential Test Results of Pocari Pulse Rate and Mineral Water Pulse Rate

	Result	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	Pocari Pulse- Mineral Pulse	12,444	24,981	1,494	8	0,173

Discussion

Water is one of the drinks consumed by many people. The benefit of water is to carry the heat that arises because the muscles are actively moving, to the skin, to then be discharged from the body through sweat. Most sports people lack drinking water even though the person often does sports regularly but there are still many people lacking to drink mineral water, the impact of this lack of drinking water decreases performance when doing sports, especially an athlete, it is very important to drink mineral water after doing sports or training because the body after doing sports lacks fluids when the body lacks fluids the body will feel weak (Gracia & Tamburian, 2020). Even sports such as skateboarding also care about mineral water, the skateboarding community in Indonesia is still

e-ISSN:2988-4942

lacking to bring mineral water because they care about the style they use, it is recommended that the style they use has a place to store mineral water (Shyafary & Rahman, 2020).

The importance of keeping body fluids from decreasing after we do excessive physical activity can cause the maximum pulse rate the use of mineral water reduces so that there is no disease because when the pulse rate is maximum it can be dangerous (Narindra et al., 2020). Water is useful for replacing fluids due to physical activity because water when given other additives such as glucose will only slow down the delivery of water from the stomach into the bloodstream. When doing physical activity a lot of body fluids are lost through sweat. the benefits of water are that the body temperature can be low and the pulse rate is low during physical activity (Abizar et al., 2021).

The mineral water can also maintain the physical condition so that the immune system is maintained not easily dating the athlete's disease also pays attention to fluids in the body by often drinking mineral water recommended by each athlete so as not to get sick easily (Alit Arsani, 2014). For improving health and fitness there are exercises that are routinely carried out by maintaining health and fitness, there is an intake of drinks, namely mineral water (Saputra et al., 2023). Consuming good and sufficient mineral water for the body can help the process of regulating the balance of the body, in water contained different elements terakndung in water such as calcium, fluoride, magnesium, sulfate, and others. Lack and excess of minerals or elements can have an impact on general health (Kurniawan et al., 2022).

The fast fatigue of the body is due to the lack of drinking water, the importance of water in the body so as not to lose fluid in the body, we must drink more water so that the body does not get tired easily If the lack of water also causes a decrease in the blood pumped by the heart, so that the oxygen sent to the muscles will also decrease, causing fatigue prematurely.When performing physical activity (exercise) requires oxygen to the muscles that are actively working (Agustin et al., 2022). Let alone weakened muscles, water also serves to relieve pain during menstrual women when menstrual pain is lack of sensitivity to maintain health by drinking enough water. Adequate water consumption can help supply oxygen that binds to hemoglobin and restore blood circulation volume so that blood flow becomes smooth during menstruation and reduce pain (Mulyani et al., 2022).

The growth and development process of each child requires balanced nutrition. Nutritional elements of balanced nutrition include carbohydrates, fats, proteins, vitamins, water and minerals with the right dose. Older people often assume that a healthy child is an obese child. Research provides evidence that there is an association between maternal education, genetics, and diet with the incidence of childhood obesity. The suggestion in this study is for teachers in schools to increase student activity to be more active, for example by inviting students to gymnastics in the morning and being active in sports lessons (Nurhaliza et al., 2023).

Conclusion

Based on the results of this study, it can be concluded that the consumption of Pocari and Mineral has no difference in the effect on pulse recovery after physical activity, especially running for 1200 meters with a 5-minute rest interval. However, the group that consumed mineral mineal showed faster pulse recovery compared to the group that only consumed Pocari. These findings indicate that the intake of additional minerals found in isotonic drinks, such as Pocari, may provide benefits in improving the body's physiological recovery process after intensive exercise. These results have important implications, especially for athletes or individuals involved in similar sports activities. The consumption of mineral-containing isotonic drinks may be an effective strategy in supporting the body's recovery after physical exercise, thereby improving overall sports performance. However, it should be noted that the results of this study may be influenced by other factors such as individual condition, training intensity, and environmental factors. Therefore, further research with a more sophisticated experimental design and tighter control of variables may provide a more in-depth understanding of the relationship between mineral water and Pocari consumption and pulse rate recovery after specific physical activities.

Acknowledgments

The author would like to thank the Tanjungpura University Sports Students for their contribution. Thanks also go to the lecturer who teaches the course so that this manuscript can be completed properly.

Conflict of Interest And Funding

There is no conflict of interest.

References

Abizar, A., Wulandari, N. R., & Irawan, I. (2021). Analisis strategi pondok pesantren dalam upaya pemberdayaan ekonomi masyarakat pada pandemi covid 19: studi di pondok pesantren raudhatul ulum sakatiga, sumatera selatan. *Kodifikasia*, *15*(2). https://doi.org/10.21154/kodifikasia.v15i2.2749

Agustin, R. catur, Ratriwardhani, R. ayu, Rhomadhoni, M. nourma, & Winarno, B. (2022). Analisis faktor-faktor yang berhubungan dengan kelelahan kerja pada kru kapal di PT.X. *Medical Technology and Public Health Journal*, *6*(1). https://doi.org/10.33086/mtphj.v6i1.3267

Alit Arsani, N. L. K. (2014). Manajemen Gizi Atlet Cabang Olahraga Unggulan di Kabupaten Buleleng. *JST (Jurnal Sains Dan Teknologi)*, *3*(2), 275–287. https://doi.org/10.23887/jst-undiksha.v3i1.2906

Audila, S. A., & Saraswati, T. G. (2021). Pengaruh Iklan Terhadap Brand Awareness Dan Dampaknya Terhadap Keputusan Pembelian Pada Produk Pocari Sweat. *EProceedings …*.

Budiman, S. T., & Ray, H. R. D. (2021). Perbandingan pengaruh air kelapa dan minuman isotonik terhadap tingkat hidrasi atlet cabang olahraga bola basket. *Jurnal Ilmu Faal Olahraga Indonesia*, *2*(1). https://doi.org/10.51671/jifo.v2i1.79

Damanik, S. W., Zulnazri, Z., Ginting, Z., Hakim, L., & Nurlaila, R. (2022). Pembuatan tawas dari kaleng bekas berbahan aluminium untuk penjernih air payau. *Chemical Engineering Journal Storage (CEJS)*, *1*(4). https://doi.org/10.29103/cejs.v1i4.5795

Fadilah, I. N., Kusniawati, A., & ... (2021). Pengaruh Reference Group Dan Word Of Mouth Terhadap Keputusan Pembelian (Suatu Studi Pada Konsumen Minuman Isotonik Merek Pocari Sweat Di Toserba Gunasalma Kawali). *Business Management and …*, *2*(4), 115–125.

Gracia, J. H., & Tamburian, H. H. D. (2020). Efektivitas Kampanye Ayo Minum untuk Sehat terhadap Kepercayaan Konsumen Le Minerale. *Prologia*, *4*(1). https://doi.org/10.24912/pr.v4i1.6426

Japeri, J., Syauqi, M. F., Anhar, A. Al, & Wahyudi, F. (2022). Rancang Bangun Alat Pendeteksi Stres Dan Dehidrasi Berbasis Internet Of Things (Iot). *Technologia : Jurnal Ilmiah*, *13*(1). https://doi.org/10.31602/tji.v13i1.5892

Kurniawan, D., Susanto, L., & Utomo, A. W. (2022). Peningkatan kesehatan dan kebugaran jasmani Perkasa Fitness Kota Madiun. *Journal Power Of Sports*, *5*(1). https://doi.org/10.25273/jpos.v5i1.16381

Lukman Hakim, & Oktavia Monalisa. (2022). Analisis Semiotika Roland Barthes Pada Iklan Pocari Sweat Versi Ramadhan 1442 H. *Mediakita*, *6*(2). https://doi.org/10.30762/mediakita.v6i2.451

Mulyani, Nur, Sudaryanti, Lestari, Dwiningsih, & Ratna, S. (2022). Hubungan usia menarche dan lama menstruasi dengan kejadian dismenorea primer. *Journal Of Health, Education and Literacy, e-Issn : 2621-9301, p-Issn : 2714-7827*, *4*(2).

Mulyatun, M., Masrullita, M., Ginting, Z., Azhari, A., & Kurniawan, E. (2022). Karakteristik Tawas Dari Kaleng Minuman Bekas Dengan Katalis Koh Dan Naoh Untuk Penjernih Air. *Chemical Engineering Journal Storage (CEJS)*, *2*(3). https://doi.org/10.29103/cejs.v2i3.6165

Narindra, N. Y., Basuki, S. W., Risanti, E. D., & Hernawan, B. (2020). Efek Pemberian Air Kelapa Dan Air Mineral Terhadap Kebugaran Jasmani. *Herb-Medicine Journal*. https://doi.org/10.30595/hmj.v3i2.6744

e-ISSN:2988-4942

Nurhaliza, N. Z., Nasution, Z., & Nasution, R. S. (2023). Faktor Yang Berhubungan Dengan Kejadian Obesitas Pada Anak Sekolah Di Sdn 002 Sapat Kecamatan Kuala Indragiri Riau Tahun 2021. *Jurnal Kesehatan Dan Fisioterapi*, *3*(1).

P, A., Panjaitan, M. A., T, M., R, M., & L, S. (2022). New Normal : Newstart – A Healthy Lifestyle. *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*, *5*(11). https://doi.org/10.33024/jkpm.v5i11.7332

Palar, C. M., Wongkar, D., & Ticoalu, S. H. R. (2021). Profil Tingkat Volume Oksigen Maskimal. *Jurnal Kesehatan Jasmani Dan Olah Raga*, *5*(2).

Pradana, A. K., Manggabarani, S., Anggraini, R. D., & Tanuwijaya, R. R. (2022). Perbedaan Minuman Isotonik Alami Air Kelapa Dengan Air Gula Aren Terhadap Status Hidrasi Dan Performa Atlet Futsal. *Jurnal Rumpun Ilmu Kesehatan*, *2*(3). https://doi.org/10.55606/jrik.v2i3.668

Pramono, H., Tih, F., & Haryono, A. G. (2014). Perbandingan Efek Pemberian Air Mineral dan Air Isotonik terhadap Endurance Selama Melakukan Aktivitas Lari Jarak Jauh Selama 30 Menit pada Pria Dewasa Non Atlet. *Fakultas Kedokteran Universitas Maranatha*.

Purwanto, E. (2021). Analisis Kesadaran Merek (Brand Awareness) pada Minuman Isotonik dan Sikap Konsumen terhadap Produk Minuman Isotonik Merek Pocari Sweat. *Ethos : Jurnal Penelitian Dan Pengabdian Kepada Masyarakat*, *Vol 7*, *No.*

Samodra, Y. T. J. (2020). Pengaruh dehidrasi (kehilangan) cairan 2.8% terhadap prestasi lari 400 meter. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*. https://doi.org/10.29407/js_unpgri.v6i2.14484

Saputra, E., Putra, M. E., Rianto, L., Tjahyanto, T., Widiyati, R., & Aziz, I. (2023). Profil kebugaran jasmani pada mahasiswa yang mengikuti latihan beban: Yo-yo intermittent test level 1. *Tanjungpura Journal of Coaching Research*, *1*(1), 18–23. https://doi.org/10.26418/tajor.v1i1.63856

Saraswati, U., & Rahmawati, I. (2021). Pengaruh Iklan Dan Brand Image Terhadap Minat Beli Konsumen Pada Produk Pocari Sweat (Study Pada Mahasiswa Fakultas Ekonomi Universitas KH. A. Wahab Hasbullah). *Jurnal Ilmiah Bisnis Dan Ekonomi TRIANGLE*, *2*(2), 65–75. https://trianglesains.makarioz.org/index.php/JTS/article/view/113

Shyafary, D., & Rahman, A. A. (2020). Desain Sarana Bawa Skateboard. *Jurnal Kreatif : Desain Produk Industri Dan Arsitektur*, *3*(2). https://doi.org/10.46964/jkdpia.v3i2.87

Sulastio, A., Afniza, R., & Vai, A. (2022). Hubungan Status Hidrasi Dengan Vo2 Max Pada Atlet Karate Tako Forki Bengkalis. *Musamus Journal of Physical Education and Sport (MJPES)*, *4*(02). https://doi.org/10.35724/mjpes.v4i02.4299

Syafikarani, A., Deanda, T. R., & Nabila, G. P. (2021). Visualization of Indonesian culture as backgrounds in Pocari Sweat Ads "Bintang SMA." In *Dynamics of Industrial Revolution 4.0: Digital Technology Transformation and Cultural Evolution*. https://doi.org/10.1201/9781003193241-62

Wijayanto, C. S., & Iswari, F. (2021). Semiotics Analysis of Roland Barthes' Theory on Pocari Sweat's "Sweat for Dream" Advertisement. *Cultural Syndrome*, *3*(2). https://doi.org/10.30998/cs.v3i2.804

Information about the authors:

Dede Gunawan; dede221hsm@gmail.com; Department of Sports Coaching Education, Faculty of Teacher Training and Education, Universitas Tanjungpura; Pontianak, Indonesia

Joselito M. Custodio; jmcustodio@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

John Paul C. Suniga; jcsuniga@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Menard Ian Laoan; milaoan@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Dragutin Stojmenović; https://orcid.org/0000-0001-5772-5692; dragutin.stojmenovic@gmail.com; Department of Physiology, Faculty of Medical Sciences, University of Kragujevac; Serbia

Tanjungpura Journal of
Coaching Research
Tanjungpura Journal of Coaching Research 2023: 1(3): 94-100
https://jurnal.untan.ac.id/index.php/TAJOR/index

Original Research

The balance before and after dehydration: an experiment to see the difference

Muhammad Iqbal Purnomo[1ABCD]*, Patrick John B. Roldan[2BCE], John Paul A. Cabarles[2DE], Janna Marie B. Quinto[2BCD], Jose Vicente Garcia-Jimenez[3E]

[1]*Department of Sport Coaching Education, Universitas Tanjungpura, Indonesia*
[2]*Department of Physical Education, Mariano Marcos State University,Philippines*
[3]*Department of Artistic, Music and Physical Education, University of Murcia, Spain*
**Coresponding Author: pbroldan@mmsu.edu.ph*

Authors' contribution:
A. Conception and design of the study; B. Acquisition of data; C. Analysis and interpretation of data; D. Manuscript preparation; E. Obtaining funding

How Cite: Purnomo, M. I., Roldan, P. J. B., Cabarles, J. P. A., Quinto, J. M. B., & Garcia-Jimenez, J. V. (2023). The balance before and after dehydration: an experiment to see the difference. *Tanjungpura Journal of Coaching Research, 1*(3), 94–100. https://doi.org/10.26418/tajor.v1i3.73049

Abstract

Background and Study Aim. Balance is the ability to maintain the position of the body when standing, doing activities, also useful equilibrium, posture in order to be able to perform movement activities properly, water is very important for humans which is useful for maintaining cell hemostasis, fluid management interventions that pay attention to intek and output records that te Physical activity is a movement that involves muscles and energy working harder. This study aims to determine the difference in the effect before and after dehydration on body balance.

Material and Methods. This research is a descriptive experiment. This research was conducted at the Sultan Syarif Abdurahman stadium field, Pontoianak City. The population used Sports Coaching Education students. Purposive sampling technique so that 16 students were sampled. The treatment was in the form of running 400m x 5 with a percentage of dehydration of 2%. Furthermore, the data were analyzed using SPSS 26.

Results. The results showed a significance value of 0.241> 0.05, it can be concluded that there is no significant difference before and after dehydration on body balance. However, the calculation results can be seen that the mean balance will decrease if the body is dehydrated.

Conclusions. Although there is a variation in the mean value, the difference does not reach the level of statistical significance. Thus, it can be concluded that body balance is not significantly affected by fluid loss before and after dehydration.

Article History
Received: 15.11.2023
Accepted: 18.12.2023
Published: 20.12.2023

Keywords
Balance _1;
Dehydration _2;
Fluid_3
College Students _4

Introduction

The term "body" encompasses the entirety of an individual's physical structure, comprising organs, bones, muscles, skin, and other components. It serves as a tool for engaging in various daily activities (Khotimah et al., 2021). The body is a complex system of interconnected organs and

systems collaborating to sustain life and health. It consists of diverse systems, including the respiratory, digestive, circulatory, nervous, endocrine, reproductive, and more, each performing distinct functions to uphold bodily equilibrium. These functions involve essential processes like digestion, temperature regulation, immune maintenance, and others (Hidayat & Syahputra, 2020; Rasyid, 2021).

The human body, equipped with muscles and skeletons, facilitates movement and supports good posture through regular exercise, sufficient rest, and a balanced diet. Engaging in physical or mental activities aimed at preserving and enhancing body health qualifies as sports or exercise (Ramadhan & Bulqini, 2018; Rasyid, 2021). Physical activity entails muscle involvement and heightened energy expenditure (Leonardo & Komaini, 2021; Saputro & Juntara, 2022). Muscles, as active tissue, contribute to bodily movement (Putri et al., 2020). Sports demand stable physical fitness to ensure overall well-being (Lloret et al., 2023).

An active body, when not replenished with adequate water to compensate for fluid loss, is susceptible to dehydration (Niyalatul Muna et al., 2020). Dehydration occurs when the body loses a substantial amount of fluids, leading to significant physiological changes (Perdana et al., 2022; Saputro & Juntara, 2022). High temperatures, exceeding 45 degrees Celsius, exacerbate the risk of dehydration, evident in the color of urine (Wang et al., 2023). Maintaining balance during exercise refers to the body's capacity to sustain a specific position or execute controlled movements. Balance training may involve activities such as one-legged standing, dynamic movements with stability, or utilizing aids like balance balls or boards (Rasyid, 2021; Zemková, 2014).

Balance involves managing the caloric intake and expenditure within the body. Maintaining energy balance occurs when the calories consumed align with those burned through physical activity. An energy imbalance, where more calories are consumed than expended, can result in weight gain. Postural balance and movement coordination pertain to the body's capability to sustain a stable position and execute movements with proper coordination (Kemenkes, 2021; Rasyid, 2021). Exercises targeting these aspects enhance core muscle strength, promote joint stability, and refine overall body coordination.

Enhancing balance in sports offers advantages such as optimizing proficiency in technical movements, preventing falls or injuries, and enhancing performance in specific sports (Rasyid, 2021; Rimasa & Sartono, 2020). Recent advancements in research have shed light on the impact of dehydration on body balance, primarily by comparing conditions before and after dehydration. These studies explore various facets, from neuromuscular responses to alterations in postural strategies, contributing to a deeper comprehension of body balance within the context of modified hydration status. Consequently, this study sought to discern disparities in the effects of pre- and post-dehydration on body balance.

Materials and Methods

Participants.

This study was conducted at the Sultan Syarif Abdurahman stadium field, involving students from the Sports Coaching Education Study Program. The sampling method employed was purposive sampling, resulting in a sample size of 16 students, comprising 12 males and 4 females, with an average age range of 19-20 years.

Research Design.

The research adopted an experimental approach. Initially, participants underwent digital body weight measurements to assess hydration status by monitoring changes in body weight. Dehydration, equivalent to 2% of body weight loss, was then determined. Prior to dehydration, participants underwent a balance test involving closing their eyes, placing hands on their waists, and lifting one leg, measuring the duration they could maintain an upright stance. Subsequently, the treatment involved five 400m runs. After experiencing 2% dehydration, participants underwent a final test,

e-ISSN:2988-4942

involving body weight measurements. If the predetermined body weight was not attained, participants underwent sunbathing with a raincoat, lasting 2-5 minutes, until the target body weight was achieved.

Statistical analysis.

Descriptive analysis was employed to interpret the data obtained, utilizing the SPSS version 26 application. The statistical analysis encompassed a normality test and hypothesis testing.

Results

This research was conducted on May 7, 2023 and was conducted in the morning at the Sultan Syarif Abdurahman stadium field. The dehydration process is done by jogging 400x5 on the running track. The calculation results can be seen that the average balance will decrease if the body is dehydrated, which before dehydration has an average balance of 22.25 seconds and after dehydration the balance drops to 18.27 seconds. The results can be seen in table 1 and figure 1.

Table 1. Description of Balance Results Before and After Dehydration

Result		Before Dehydration	After Dehydration
N	Valid	16	16
	Missing	16	16
Mean		22.25	18.27
Median		246.400	172.600
Mode		29.72	11.34

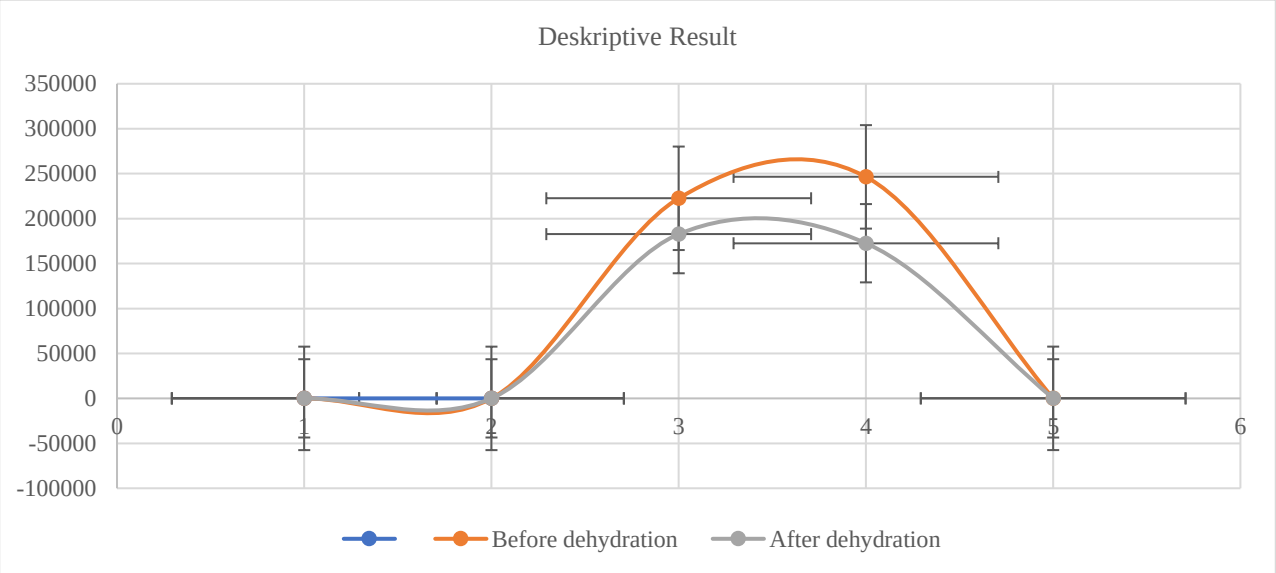

Figure 1. Before and After Dehydration

However, if the data is considered significant when calculated at (p> 0.05). Can be concluded normal. If the data is normal, parametric tests can be carried out. Parametric tests are carried out with independent tests. The results are seen in table 2.

Based on the results of the difference test, the significance value is 0.241> 0.05, which means there is no significant difference. These results provide information that before dehydration and after dehydration do not provide significant differences in body balance. The results can be seen in table 3.

Table 2. Uji normality in the One-Sample Kolmogorov-Smirnov Test

Result		Before dehydration	After dehydration
N		16	16
Normal Parameters[a,b]	Mean	222.581	182.719

	Std. Deviation	949.734	937.400
Most Extreme Differences	Absolute	.170	.181
	Positive	.093	.181
	Negative	-.170	-.167
Test Statistic		.170	.181
Asymp. Sig. (2-tailed)		.200[c,d]	.167[c]

Table 3. Independent Sample Test Before and After Dihedration

Balance	Result	F	Mean	t	df	Sig. (2-tailed)
Before and After Dehydration	Equal variances assumed	.089	.767	1.195	30	.241
	Equal variances not assumed			1.195	29.995	.241

Discussion

This research aims to assess the impact of dehydration on body balance and explore potential differences before and after dehydration. The findings indicate no significant difference in body balance pre- and post-dehydration. However, the mean balance value before dehydration (22.25) is higher than after dehydration (18.27), showing a difference of 3.98 seconds. In contrast, prior studies on dehydration during running activities yielded significant differences before and after dehydration (Hidayatulloh & Gandasari, 2023).

Water, a vital nutrient for the body, influences the composition of muscle and adipose tissue due to varying water content (Nurfrida & Lestari, 2023). Dehydration, characterized by the loss of solutes and water, can disrupt the body's thermoregulation and cardiovascular functions (Sannolo & Carretero, 2019). The consequences of dehydration include health risks and an increased workload on the body. Dehydrated individuals may experience elevated body temperature, reduced reaction speed, and concentration due to inhibited energy production (Ramdhan & Rismayanthi, 2016). Fluid intake plays a crucial role in dissolving compounds, regulating body temperature, lubricating joints, serving as a means of transportation, and maintaining normal cell structures and functions (Habibati et al., 2022).

Dehydration is often overlooked, as its effects may not be immediately apparent or significant. It occurs when fluid intake is insufficient compared to fluid loss (Leksana, 2015; Sari Maslicha & Anang S.B, 2017). Hence, early detection techniques for body dehydration are essential to prevent more severe health issues (Wahiddin, 2020). Recognizing the importance of hydration, especially for athletes, is crucial for optimal performance, as a decrease in body fluid levels can compromise endurance capacity during exercise (Fen Tih et al., 2017).

Water is a critical component for maintaining cellular homeostasis in the human body (Maryanto, 2020). Effective strategies to address dehydration involve implementing fluid management interventions with careful monitoring of intake and output records (Muhammad et al., 2020). Ensuring adequate fluid administration throughout training and competitions plays a vital role in preserving hydration status (Haetami et al., 2022). Dehydration can adversely impact cardiovascular performance and disrupt the regulation of body thermoregulation (Kusuma, 2020). Electrolytes are instrumental in maintaining fluid balance, and a deficiency in electrolytes can contribute to dehydration (Nahdlotul Halimi et al., 2019).

The concept of balance holds immense importance, encompassing physical elements crucial for both sports and daily activities (Indrawathi, 2017). It entails the ability to sustain a stable body position while standing (Munawarah, 2019). The capacity to maintain balance is vital for various activities, contributing to the maintenance of gravitational position, particularly when standing upright (Afafah, 2018). Balance plays a key role in preserving posture and facilitating proper movement activities (Raharjo et al., 2020). Static balance, specifically, refers to the ability to sustain

e-ISSN:2988-4942

a balanced state while the body is at rest (D'Antonio et al., 2020), ensuring that the body position remains unchanged (Kartiyani et al., 2016).

Unfortunately, there is often a lack of awareness regarding this understanding, leading to the common mistake of only drinking water when thirsty. This habit can result in an imbalanced fluid circulation and regeneration due to insufficient comprehension of the nutritional levels required by bodily fluids (Kusumawardani & Larasati, 2020)

Conclusion

Conclusion from this study states that before and after dehydration on balance showed no significant difference. Although there were variations in the mean values, the differences did not reach the level of statistical significance. Therefore, it can be concluded that body balance is not significantly affected by fluid loss before and after dehydration. These results provide different information to previous studies related to fluid deprivation. However, it should also be understood that this study did not look at other factors such as the health condition of the sample and other factors that might affect the results of the study. Recommendations for further research can add other variables that are factors that affect the balance of fluid loss.

Acknowledgments

The author would like to thank the Tanjungpura University Sports Students for their contribution. Thanks also go to the lecturer who teaches the course so that this manuscript can be completed properly.

Conflict of Interest And Funding

There is no conflict of interest.

References

Afafah, M. N. F. (2018). Analisis Keseimbangan Statis Dan Keseimbangan Dinamis Wanita Paguyuban Olahraga Lansia Perumahan Pongangan Indah Gresik. *Jurnal Kesehatan Olahraga IKOR FIO UNESA*, *6*(2). https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/25124

D'Antonio, E., Tieri, G., Patané, F., Morone, G., & Iosa, M. (2020). Stable or able? Effect of virtual reality stimulation on static balance of post-stroke patients and healthy subjects. *Human Movement Science*, *70*, 102569. https://doi.org/10.1016/j.humov.2020.102569

Fen Tih, -, Pramono, H., Hasianna, S. T., Naryanto, E. T., Haryono, A. G., & Rachman, O. (2017). Efek Konsumsi Air Kelapa (*Cocos Nucifera*) terhadap Ketahanan Berolahraga Selama Latihan Lari pada Laki-laki Dewasa Bukan Atlet. *Global Medical & Health Communication (GMHC)*. https://doi.org/10.29313/gmhc.v5i1.1966

Habibati, A. F., Sa'adah, U. L., & Sulistyorini, L. (2022). Hubungan Asupan Cairan dan Iklim Kerja dengan Status Hidrasi Pekerja Home Industry Keripik Pisang Lumajang. *Media Gizi Kesmas*, *11*(1), 95–101. https://doi.org/10.20473/mgk.v11i1.2022.95-101

Haetami, M., Gandasari, M. F., Sastaman, P., & Suwanto, W. (2022). Status Dehidrasi Setelah Latihan Man To Man Pada Cabang Olahraga Futsal. *Jurnal Pendidikan Olahraga*, *11*(2). https://doi.org/10.31571/jpo.v11i2.4905

Hidayat, S., & Syahputra, A. A. (2020). Sistem Imun Tubuh Pada Manusia. *Visual Heritage: Jurnal Kreasi Seni Dan Budaya*, *2*(03).

Hidayatulloh, K., & Gandasari, M. F. (2023). Dampak Kehilangan Cairan Terhadap Aktivitas lari 5 Putaran Sebelum dan Sesudah Dehidrasi. *Journal of S.P.O.R.T*, *7*(3), 661–672. https://doi.org/10.37058/sport.v7i3.8828

Indrawathi, N. L. P. (2017). Pengaruh Latihan Senam Lantai Terhadap Peningkatan Keseimbangan

Statis Mahasiswa Fakultas Pendidikan Olahraga Dan Kesehatan (FPOK) IKIP PGRI Bali Tahun Pelajaran 2017. *Jurnal Pendiidikan Kesehatan Rekreasi*, *3*(2), 28–32. https://doi.org/10.59672/jpkr.v3i2.233

Kartiyani, T., Al-Irsyad, W. S.-J. K., & 2018, undefined. (2016). Perbedaan pengaruh latihan pilates dengan latihan wobble board terhadap keseimbangan ditinjau dari jenis kelamin pada remaja. *Jka.Stikesalirsyadclp.Ac.Id*, *IX*(2).

Kemenkes. (2021). *Pintar Gizi Bagi Atlet*. Kementerian Kesehatan Republik Indonesia.

Khotimah, D. F., Faizah, U. N., & Sayekti, T. (2021). Protein sebagai Zat Penyusun dalam Tubuh Manusia: Tinjauan Sumber Protein Menuju Sel. *Proceeding of Integrative Science Education Seminar*, *1*(1), 127–133. https://prosiding.iainponorogo.ac.id/index.php/pisces/article/view/117

Kusuma, A. D. (2020). Penilaian Status Hidrasi. *Jurnal Ilmiah Kesehatan Sandi Husada*, *11*(1). https://doi.org/10.35816/jiskh.v11i1.196

Kusumawardani, S., & Larasati, A. (2020). Analisis Konsumsi Air Putih Terhadap Konsentrasi. *Jurnal Holistika*, *4*(2). https://doi.org/10.24853/holistika.4.2.91-95

Leksana, E. (2015). Dehidrasi dan syok. *Cermin Dunia Kedoktean*, *42*(5), 398602. https://cdkjournal.com/index.php/cdk

Leonardo, A., & Komaini, A. (2021). Hubungan Aktivitas Fisik Terhadap Keterampilan Motorik. *Jurnal Stamina*, *4*(3), 135–144. http://stamina.ppj.unp.ac.id/index.php/JST/article/view/764

Lloret, J., Gómez, S., Rocher, M., Carreño, A., San, J., & Inglés, E. (2023). The potential benefits of water sports for health and well-being in marine protected areas: a case study in the Mediterranean. *Annals of Leisure Research*, *26*(4), 601–627. https://doi.org/10.1080/11745398.2021.2015412

Maryanto, E. P. (2020). Dampak Dehidrasi Saat Masa Kehamilan. *Jurnal Ilmiah Kesehatan Sandi Husada*, *12*(2). https://doi.org/10.35816/jiskh.v12i2.438

Muhammad, I., Isro'in, L., & Verawati, M. (2020). Studi Kasus : Upaya Pemenuhan Volume Cairan Pada Pasien Dewasa Penderita Gastroentritis Di Rsu Muhammadiyah Ponorogo Ruang Mas Mansyur. *Health Sciences Journal*, *4*(1). https://doi.org/10.24269/hsj.v4i1.401

Munawarah, S. (2019). Pengaruh Pemberian Senam Yoga Terhadap Keseimbangan Statis Pada Lansia 2019. *Human Care Journal*, *4*(2). https://doi.org/10.32883/hcj.v4i2.465

Nahdlotul Halimi, M. A., Fauzan, M. N., Habibi, R., & Riza, N. (2019). Drimm: Drink Mixing Machine Untuk Membantu Pedagang Minuman Menentukan Takaran Air Yang Konsisten. *Jurnal Ilmiah Teknologi Infomasi Terapan*, *5*(2). https://doi.org/10.33197/jitter.vol5.iss2.2019.257

Niyalatul Muna, Faisal Lutfi Afriansyah, & Ameng Bagus Suprayogy. (2020). Penerapan Algoritma Random Forest Untuk Identifikasi Dehidrasi Berbasis Citra Urine. *Jurnal Informatika Polinema*, *6*(3). https://doi.org/10.33795/jip.v6i3.348

Nurfrida, D. R., & Lestari, Y. N. (2023). Korelasi Antara Asupan Cairan Dengan Status Hidrasi Pekerja Bagian Produksi Air Minum Dalam Kemasan di Pt.X Semarang. *Jambura Journal of Health Sciences and Research*, *5*(2), 862–873. https://doi.org/10.35971/jjhsr.v5i3.20760

Perdana, I., Suharto, S., Yunalia, E. M., Haryuni, S., Emiliana, P., Rahardjo, S. A., Handayani, W., Jalan, ;, No, S., City, K., Studi, P., Keperawatan, I., Kesehatan, I., & Kediri, U. K. (2022). Hubungan antara Derajat Dehidrasi dengan Suhu Tubuh pada Anak dengan Diare di IGD RSUD Wamena. *Nursing Sciences Journal*, *6*(2).

Putri, A. E., Donie, Fardi, A., & Yenes, R. (2020). Metode Circuit training Dalam Peningkatan Daya Ledak Otot Tungkai Dan Daya Ledak Otot Lengan Bagi Atlet Bolabasket. *Jurnal Patriot*, *2*(3).

Raharjo, S., Ridhoi, A., & Kinanti, R. G. (2020). Survei Tingkat Keseimbangan Statis Siswa Tunarungu Sdlb di Kota Malang. *Jurnal Sport Science*, *10*(1). https://doi.org/10.17977/um057v10i1p53-59

Ramadhan, A., & Bulqini, A. (2018). Analisis Receive pada Pertandingan Final Sepak Takraw Pomda Jatim 2017. *JSES : Journal of Sport and Exercise Science*, *1*(1).

https://doi.org/10.26740/jses.v1n1.p13-19

Ramdhan, R. I., & Rismayanthi, C. (2016). Hubungan Antara Status Hidrasi Serta Konsumsi Cairan Pada Atlet Bola Basket. *Medikora*, *15*(1). https://doi.org/10.21831/medikora.v15i1.10068

Rasyid, M. F. A. (2021). Pengaruh Asupan Kalsium Terhadap Indeks Masa Tubuh (IMT). *Jurnal Medika Hutama*, *2*(4), 1094–1097. http://www.jurnalmedikahutama.com/index.php/JMH/article/view/226

Rimasa, D., & Sartono, H. (2020). Kontribusi Kelincahan dan Keseimbangan terhadap Hasil Serangan Teknik Ballestra pada Olahraga Anggar Jenis Senjata Sabel. *Jurnal Kepelatihan Olahraga*, *12*(1). https://doi.org/10.17509/jko-upi.v12i1.24012

Sannolo, M., & Carretero, M. A. (2019). Dehydration constrains thermoregulation and space use in lizards. *PLoS ONE*, *14*(7), 1–17. https://doi.org/10.1371/journal.pone.0220384

Saputro, Y. A., & Juntara, P. E. (2022). Jurnal Pengabdian Olahraga di Masyarakat. *Jurnal Pengabdian Olahraga Di Masyarakat*, *3*(2), 89–95.

Sari Maslicha, L. W., & Anang S.B, T. W. (2017). Hubungan Asupan Kalium Dan Natrium Dengan Kejadian Dehidrasi Pada Remaja Di Smk Muhammadiyah 04 Boyolali. *Profesi (Profesional Islam) : Media Publikasi Penelitian*, *15*(1). https://doi.org/10.26576/profesi.222

Wahiddin, D. (2020). Klasifikasi Kadar Hidrasi Tubuh Berdasarkan Warna Urine dengan Metode Ekstraksi Fitur Citra dan Euclidean Distance. *Techno Xplore : Jurnal Ilmu Komputer Dan Teknologi Informasi*, *5*(2). https://doi.org/10.36805/technoxplore.v5i1.887

Wang, B., Li, Y., Lv, Y., Jiao, X., Wang, Z., He, Y., & Wen, L. (2023). Dehydration–rehydration mechanism of vegetables at the cell-wall and cell-membrane levels and future research challenges. In *Critical Reviews in Food Science and Nutrition* (pp. 1–17). https://doi.org/10.1080/10408398.2023.2233620

Zemková, E. (2014). Sport-specific balance. In *Sports Medicine* (Vol. 44, Issue 5). https://doi.org/10.1007/s40279-013-0130-1

Information about the authors:

Dede Gunawan; dede221hsm@gmail.com; Department of Sports Coaching Education, Faculty of Teacher Training and Education, Universitas Tanjungpura; Pontianak, Indonesia

Patrick John B. Roldan; pbroldan@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

John Paul A. Cabarles; jacabarles@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Janna Marie B. Quinto; jmbquinto@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Jose Vicente Garcia-Jimenez; https://orcid.org/0000-0001-7731-2609; jvgjimenez@um.es; Deparment of Artistic, Music and Physical Education, Faculty of Education, University of Murcia; Murcia, Spain

Tanjungpura Journal of
Coaching Research
Tanjungpura Journal of Coaching Research 2023: 1(3): 101-108
https://jurnal.untan.ac.id/index.php/TAJOR/index

Original Research

Pulse rate during running 5 laps: comparative study before and after dehydration?

Dirzal Apriandi[1ABCE], Vince Louisse D. Salacup[2ABCD]*, Reygan A. Butali[2CDE], Derick Sam A. Cadiente[2BC], Roy Ardian[3BCE], Irvan Septianto[3DE], Jihan Azrina[3E]

[1]*Department of Sport Coaching Education, Universitas Tanjungpura, Indonesia*
[2]*Department of Physical Education, Mariano Marcos State University,Philippines*
[3]*Department of Sport Science, Universitas Negeri Yogyakarta, Indonesia*
**Coresponding Author: vlsalacup@mmsu.edu.ph*

Authors' contribution:
A. Conception and design of the study; B. Acquisition of data; C. Analysis and interpretation of data; D. Manuscript preparation; E. Obtaining funding

How Cite: Apriandi, D., Salacup, V. L. D., Butali, R. A., Cadiente, D. S. A., Ardian, R., Septianto, I., & Azrina, J. (2023). Pulse rate during running 5 laps: comparative study before and after dehydration? *Tanjungpura Journal of Coaching Research, 1*(3), 101-1–8. https://doi.org/10.26418/tajor.v1i3.73047

Abstract

Background and Study Aim. Dehydration is a condition where there is a lack of fluid in the body, accompanied by disturbances in the body's metabolic processes. This study aims to prove the effect of dehydration on 5 lap running by comparing the pulse rate before and after dehydration.

Materials and Methods. This study used an experimental method. The population in this research is Tanjungpura University sports students. Purposive sampling technique so that a sample of 19 students was obtained. The sample consists of 4 women and 15 men. In the research, the implementation procedure will be to measure 2000 meter running performance before and after losing fluid, weighing body weight to precision ounces. Analysis was assisted using SPSS 26.

Results. The results of the analysis showed a significance value of 0.000 <0.05, which is a significant difference between the pulse rate before and after dehydration when running 5 laps. The pulse rate after dehydration tended to be higher, indicating an increased cardiac workload during physical activity.

Conclusions. This study concludes that dehydration has a direct influence on pulse rate when running 5 laps. The existence of this difference highlights the importance of maintaining an optimal hydration state in supporting a healthy cardiovascular response during physical activity, particularly in high-intensity exercise such as running. These findings can be used as a basis for the development of more effective hydration strategies in the context of aerobic physical activity.

Article History
Received: 15.11.2023
Accepted: 20.12.2023
Published: 21.12.2023

Keywords
Pulse Rate_1;
Dehydration _2;
Run 5 laps _3;

Introduction

Engaging in physical activities like running necessitates optimal functioning of the cardiovascular system to distribute oxygen and nutrients throughout the body (Hidayatulloh & Gandasari, 2023). Pulse rate, reflecting the frequency of heart contractions per minute, stands out as

e-ISSN:2988-4942

one of the commonly measured indicators of cardiovascular performance (Schäfer & Vagedes, 2013). The equilibrium of body fluids, particularly water, is pivotal in preserving cardiovascular function during physical activity. Dehydration, characterized by the body losing more fluid than it takes in, has the potential to impact various bodily functions, including the pulse rate during running.

Dehydration occurs when the body lacks fluid due to an imbalance between fluid loss and intake. The consequences of dehydration extend to risks of obesity and reduced concentration (Sutarna, 2021). Maintaining proper hydration involves athletes consuming adequate fluids before, during, and after training sessions (Haetami et al., 2022). Previous research has demonstrated that dehydration can elevate pulse rates during exercise, indicative of potential adverse effects on physical performance and overall well-being.

Water content stands as an indispensable nutrient for the body, varying in muscle and adipose tissues with different water compositions (Nurfrida & Lestari, 2023). Dehydration, involving the loss of significant solutes and water, can disrupt the body's thermoregulation and cardiovascular functions (Sannolo & Carretero, 2019). Dehydration not only poses health risks but also increases the body's workload. Elevated body temperature, reduced reaction speed, and diminished concentration are observed when dehydration inhibits energy production (Ramdhan & Rismayanthi, 2016). Recognizing fluid intake's crucial role is imperative, given its functions such as dissolving compounds, regulating body temperature, lubricating joints, facilitating transportation, and maintaining normal cell structures and bodily functions (Habibati et al., 2022).

Dehydration often goes unnoticed due to its lack of direct and pronounced impact on the body. It is characterized by an imbalance where the amount of incoming fluid is insufficient compared to the outgoing fluid (Leksana, 2015; Sari Maslicha & Anang S.B, 2017). Thus, early detection techniques for body dehydration are essential to prevent more severe health issues (Samodra, 2020). Despite the crucial importance of physical well-being for athletes, many still neglect it in their pursuit of optimal performance, considering the level of body fluid needs as unimportant. A reduction in body fluid can diminish endurance capacity during exercise (Fen Tih et al., 2017).

Water holds great significance for maintaining cellular homeostasis in humans (Maryanto, 2020). Managing dehydration involves implementing interventions that carefully monitor fluid intake and output (Muhammad et al., 2020). Ensuring adequate fluid administration from training periods to matches is crucial for maintaining hydration status (Haetami et al., 2022). Dehydration can impact the performance of cardiovascular organs and the regulation of body thermoregulation (Kusuma, 2020). Electrolytes play a role in maintaining fluid balance, and their deficiency can contribute to dehydration (Nahdlotul Halimi et al., 2019).

However, a fundamental question that still requires further explanation is the extent to which pulse rate changes during physical activity, particularly running, when individuals are dehydrated. Is there a significant difference in pulse rate before and after dehydration? The answer to this question has important implications for athletes, coaches and physically active individuals, and may provide further guidance for hydration strategies during exercise. In this case, there was no significant change between the isotonic drink and guava juice groups on pulse rate recovery and hydration levels (Nugroho, 2022). Hydration can be caused by several factors including hot work climate and nutritional status (Jayasekara et al., 2019).

People who experience fatigue or are still in a tired condition, one of which will be seen from the pulse rate above the normal pulse rate, the pulse rate measurement is calculated how many beats in 1 minute. A good VO2 max influences the heart performance process when running (Pramono et al., 2018). But this anaerobic glycolysis metabolic pathway produces a by-product called lactic acid (Nagara & Roepadjadi, 2020). At the time of recovery, electrolyte fluids can stabilize the body, especially the pulse rate, therefore body position affects the pulse recovery process, such as when supine has the highest percentage in reducing the pulse rate (Pramono et al., 2018).

In this context, this study aimed to investigate the changes in pulse rate during a 5-lap run before and after dehydration. By understanding how dehydration affects cardiovascular responses during

exercise, we can identify potential risks, improve hydration strategies, and promote awareness of the importance of maintaining hydration status to support optimal health and physical performance.

Materials and Methods

Participants.

This research was conducted at the Sultan Syarif Abdurahman pontianak stadium. The research population was students of the Tanjungpura University Sports Coaching Education study program in semester 5. The sampling technique used purposive sampling so that 19 students were obtained. The sample consists of 4 girls and 15 boys.

Research Design.

This research employs an experimental approach, utilizing a specific procedure. The methodology involves assessing the performance of running 2000 meters before and after fluid loss, with precise body weight measurements in ounces. The researchers aim to observe the impact of fluid loss through sweating during a 2000-meter run. This will be accomplished by weighing the participant before and after the run, calculating the approximate fluid loss percentage, and evaluating the running performance before and after fluid loss. The measurement of fluid loss involves utilizing tools and materials such as a stopwatch, a body weight scale with precision up to ounces, raincoat coats (to facilitate fluid loss if necessary), and a running track spanning 2000 meters. The data collection equipment includes stationery, a stopwatch, and the 5-round running track (2000 meters).

Statistical analysis.

The data collected is statistically analyzed to identify significant differences in performance parameters between the dehydrated and hydrated groups. Statistical analysis such as t-test or analysis of variance (ANOVA) may be used. In this study, analysis was assisted using SPSS 26.

Results

This study compares the results before and after dehydration. The treatment given is in the form of running 5 laps or 2000 meters, where these results are to see if before and after dehydration there is a difference in pulse rate. This research goes through the prerequisite stages of normality and hypothesis testing. Based on the results of the normality test, the significance value is 0.106 > 0.05 so it can be concluded that the data is normally distributed. The results can be seen in table 1.

The results of the difference test provide information on the significance value of 0.000 <0.05, so it can be concluded that there is a significant difference in pulse rate between before and after dehydration using the 5 lap running treatment. These results explain that lack of fluid affects and causes an increase in pulse rate, so fluid intake must be considered and maintained. Results can be seen in table 2.

Based on descriptive results, the treatment of 19 samples with a pulse value before dehydration mean 69.53 is smaller than the pulse value after dehydration mean 167.53. These results provide strong information regarding the difference in pulse rate, where there is a difference in the mean value of 45.53. Results can be seen in table 3 and figure 1.

Table 1. Uji normality in the One-Sample Kolmogorov-Smirnov Test

Result		Pulse Rate
N		19
Normal Parameters[a,b]	Mean	175.00
	Std. Deviation	14.849
Most Extreme Differences	Absolute	.215
	Positive	.143
	Negative	-.215
Test Statistic		.238

e-ISSN:2988-4942

Asymp. Sig. (2-tailed)	.106

Table 2. Independent Samples t Test Before and After Dehydration

Result		Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	Before and After Dehydration	-98.000	45.407	-9.408	18	.000

Table 3. Descriptive Results Before and After Dehydration

Result		Pulse Before Dehydration	Pulse After Dehydration
N	Valid	19	19
	Missing	1	1
Mean		69.53	167.53
Median		84.00	174.00
Mode		96	180
Std. Deviation		39.813	18.822
Minimum		11	102
Maximum		120	186

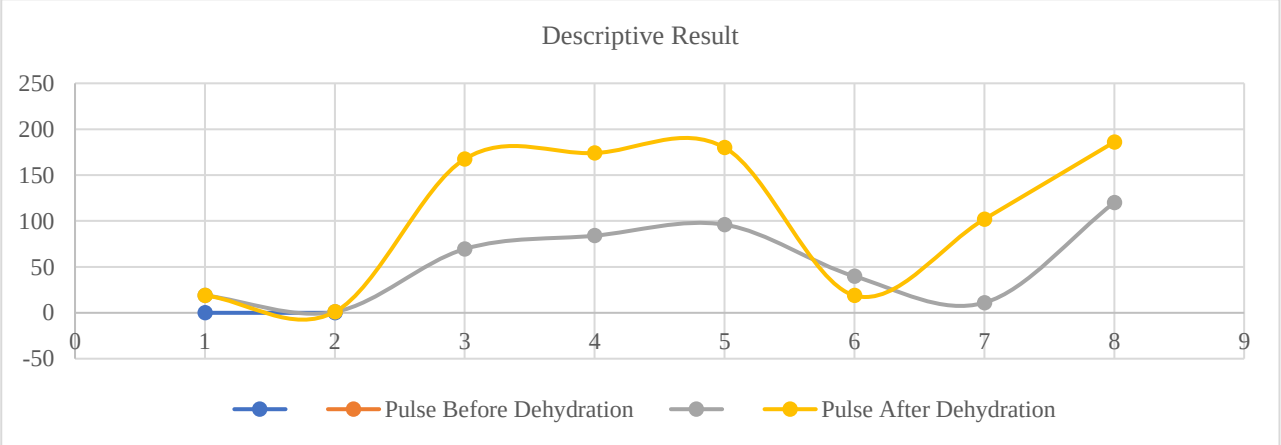

Figure 1. Descriptive Results Before and After Dehydration

Discussion

This study seeks to demonstrate the impact of dehydration on running 5 laps by comparing pulse rates before and after the onset of dehydration. The findings indicate a significant difference in pulse rates before and after dehydration, with a mean difference of 45.53. Relevant research supports the notion that significant differences exist before and after dehydration, particularly in relation to fluid levels (Hidayatulloh & Gandasari, 2023). Hydration factors come into play during intense physical activities that surpass the body's capacity (Janiszewska & Przybyłowicz, 2020). Factors like hot weather during exercise contribute to increased sweat output, affecting overall health (de Korte et al., 2021).

Temperatures exceeding 37°C can elevate cardiovascular stress, leading to increased dehydration as a physiological response to temperature elevation. The initial signs of heightened body temperature are often reflected in salivary fluid content, making the ideal exercise temperature range 20-23°C (Mintarto & Fattahilah, 2019). Measurable values such as body temperature, pulse rate, sweat output, and respiration can be assessed using tools or applications (Derisma & Saputra, 2020). Individuals, particularly those aiming for rapid weight loss, may experience substantial dehydration (Samodra, 2020). It is advisable to avoid extreme training or weight loss exceeding the 4% level, as it can adversely affect bodily performance.

In light of this, electrolyte fluids become essential during vigorous physical activity, especially in sports, to prevent dehydration (Senay, 2022). Consuming coconut water before exercise has been shown to enhance exercise endurance, particularly in adult men (Fen Tih et al., 2017). The study on the effects of honey pineapple juice on pulse rate and blood pressure after long-distance running is

noteworthy (Herlambang et al., 2022). While 400-meter running does not pose a dehydration risk and is beneficial for overall health when done with proper form (Admin & Mujahidin, 2020). Running, although beneficial for overall health, can potentially trigger a heart attack (Setiarini et al., 2021). There is a discernible difference in the impact between three-corner running training and side jump sprints on resting pulse rates (Budriarsa, 2013).

Fluid loss or dehydration doesn't solely result from activity or exercise (Suprabaningrum & Dieny, 2017). Environmental temperatures also play a role in dehydration, as even exposure to cold room temperatures can lead to mild dehydration (Mintarto & Fattahilah, 2019).). Inadequate or limited air temperature in the environment causing sweating is another factor contributing to dehydration (Elon, 2019). Hence, the body is prone to rapid dehydration in hot temperatures.

The individual variability in fluid replacement needs during activities is notable. The body's demand for fluids during sweat-inducing activities tends to differ among individuals, necessitating fluids that enhance fitness, boost stamina, and facilitate rapid recovery (Narindra et al., 2020; Rubiono & Setiawan, 2020), Some individuals opt for drinks containing caffeine, while others choose those with sodium or calcium content. However, according to research by Rodriguez-Giustiniani et al., (2022), for a balanced replacement of body fluids, the necessary fluids should contain electrolytes that function within the body's system.

Conclusion

In this study, we conducted a comparison of pulse rates during a 5-lap run before and after dehydration. The results provide a deeper understanding of the cardiovascular response to a dehydrated state during physical activity. The main finding of this study showed that there was a significant difference in pulse rate between pre- and post-dehydration conditions. Dehydration, as a state of excessive body fluid loss, was found to have a direct impact on cardiovascular responses during running. The higher pulse rate after dehydration reflects the increased workload of the heart during aerobic physical activity. This conclusion underscores the importance of maintaining an optimal state of hydration when performing physical exercise, especially in the context of high-intensity activities such as running. Dehydration can increase the risk of cardiovascular stress and affect the performance of athletes or individuals engaged in regular physical activity. Thus, a practical recommendation from this study is the importance of monitoring and maintaining a good hydration state before, during and after physical activity. Coaches, athletes and healthcare professionals can use these findings as a basis for designing hydration programs that suit individual needs, which in turn can support optimal cardiovascular health and performance. It should be noted that this study has certain limitations, and further research may be needed to further explore the impact of dehydration on other cardiovascular variables and in the context of a wider population. Nonetheless, the findings of this study make an important contribution to our understanding of the relationship between hydration and cardiovascular responses during running.

Acknowledgments

The author would like to thank the Tanjungpura University Sports Students for their contribution. Thanks also go to the lecturer who teaches the course so that this manuscript can be completed properly.

Conflict of Interest And Funding

There is no conflict of interest.

References

Admin, & Mujahidin. (2020). Kondisi sistem kardiovaskular dan kejadian nyeri tungkai bawah sesudah lari sprint 400 Meter pada siswa sekolah olahraga. *Jurnal Kesehatan Dan*

Pembangunan, 10–19. https://doi.org/10.52047/jkp.v10i19.62

Budriarsa, G. (2013). Pengaruh pelatihan lari tiga sudut dan side jump sprint terhadap denyut nadi istirahat. *Jurnal Ilmu Keolahragaan Undiksha*. https://doi.org/10.23887/jiku.v1i1.1591

de Korte, J. Q., Bongers, C. C. W. G., Hopman, M. T. E., & Eijsvogels, T. M. H. (2021). Exercise Performance and Thermoregulatory Responses of Elite Athletes Exercising in the Heat: Outcomes of the Thermo Tokyo Study. *Sports Medicine*, *51*, 2423–2436. https://doi.org/10.1007/s40279-021-01530-w

Derisma, D., & Saputra, M. H. (2020). Prototype Sistem Monitoring Kesehatan Terintegrasi dengan Keluaran Pada Smartphone Android. *Komputika : Jurnal Sistem Komputer*, *9*(1). https://doi.org/10.34010/komputika.v9i1.2785

Elon, Y. (2019). Tindakan Kompres Hangat Pada Temporal Lobe Dan Abdomen Terhadap Reaksi Suhu Tubuh Pasien Dengan Typhoid Fever. *Jurnal Skolastik Keperawatan*, *4*(1). https://doi.org/10.35974/jsk.v4i1.735

Fen Tih, -, Pramono, H., Hasianna, S. T., Naryanto, E. T., Haryono, A. G., & Rachman, O. (2017). Efek Konsumsi Air Kelapa (*Cocos Nucifera*) terhadap Ketahanan Berolahraga Selama Latihan Lari pada Laki-laki Dewasa Bukan Atlet. *Global Medical & Health Communication (GMHC)*. https://doi.org/10.29313/gmhc.v5i1.1966

Habibati, A. F., Sa'adah, U. L., & Sulistyorini, L. (2022). Hubungan Asupan Cairan dan Iklim Kerja dengan Status Hidrasi Pekerja Home Industry Keripik Pisang Lumajang. *Media Gizi Kesmas*, *11*(1), 95–101. https://doi.org/10.20473/mgk.v11i1.2022.95-101

Haetami, M., Gandasari, M. F., Sastaman, P., & Suwanto, W. (2022). Status Dehidrasi Setelah Latihan Man To Man Pada Cabang Olahraga Futsal. *Jurnal Pendidikan Olahraga*, *11*(2). https://doi.org/10.31571/jpo.v11i2.4905

Herlambang, Y., Kurniawati, D. M., & Ali, M. A. (2022). Pengaruh Jus Nanas Madu Terhadap Denyut Nadi Dan Tekanan Darah Pada Siswa Sekolah Sepak Bola Pasca Lari Jarak Jauh 10 KM. *Journal of Nutrition College*, *11*(3). https://doi.org/10.14710/jnc.v11i3.33136

Hidayatulloh, K., & Gandasari, M. F. (2023). Dampak Kehilangan Cairan Terhadap Aktivitas lari 5 Putaran Sebelum dan Sesudah Dehidrasi. *Journal of S.P.O.R.T*, *7*(3), 661–672. https://doi.org/10.37058/sport.v7i3.8828

Janiszewska, K., & Przybyłowicz, K. E. (2020). Pre-competition weight loss models in taekwondo: Identification, characteristics and risk of dehydration. *Nutrients*, *12*(9), 1293. https://doi.org/10.3390/nu12092793

Jayasekara, K. B., Kulasooriya, P. N., Wijayasiri, K. N., Rajapakse, E. D., Dulshika, D. S., Bandara, P., Fried, L. F., De Silva, A., & Albert, S. M. (2019). Relevance of heat stress and dehydration to chronic kidney disease (CKDu) in Sri Lanka. *Preventive Medicine Reports*, *15*, 100928. https://doi.org/10.1016/j.pmedr.2019.100928

Kusuma, A. D. (2020). Penilaian Status Hidrasi. *Jurnal Ilmiah Kesehatan Sandi Husada*, *11*(1). https://doi.org/10.35816/jiskh.v11i1.196

Leksana, E. (2015). Dehidrasi dan syok. *Cermin Dunia Kedoktean*, *42*(5), 398602. https://cdkjournal.com/index.php/cdk

Maryanto, E. P. (2020). Dampak Dehidrasi Saat Masa Kehamilan. *Jurnal Ilmiah Kesehatan Sandi Husada*, *12*(2). https://doi.org/10.35816/jiskh.v12i2.438

Mintarto, E., & Fattahilah, M. (2019). Efek Suhu Lingkungan Terhadap Fisiologi Tubuh pada saat Melakukan Latihan Olahraga. *JSES : Journal of Sport and Exercise Science*, *2*(1). https://doi.org/10.26740/jses.v2n1.p9-13

Muhammad, I., Isro'in, L., & Verawati, M. (2020). Studi Kasus : Upaya Pemenuhan Volume Cairan Pada Pasien Dewasa Penderita Gastroentritis Di Rsu Muhammadiyah Ponorogo Ruang Mas Mansyur. *Health Sciences Journal*, *4*(1). https://doi.org/10.24269/hsj.v4i1.401

Nagara, A. B. G. D. S., & Roepadjadi, J. (2020). Pengaruh Pemberian Sport Massage Setelah Aktifitas Fisik Terhadap Denyut Nadi Pemulihan Pada Anggota Gerakan Pramuka Universitas Negeri

Surabaya. *Jurnal Kesehatan Olahraga*, *8*(1). https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/30612

Nahdlotul Halimi, M. A., Fauzan, M. N., Habibi, R., & Riza, N. (2019). Drimm: Drink Mixing Machine Untuk Membantu Pedagang Minuman Menentukan Takaran Air Yang Konsisten. *Jurnal Ilmiah Teknologi Infomasi Terapan*, *5*(2). https://doi.org/10.33197/jitter.vol5.iss2.2019.257

Narindra, N. Y., Basuki, S. W., Risanti, E. D., & Hernawan, B. (2020). Efek Pemberian Air Kelapa Dan Air Mineral Terhadap Kebugaran Jasmani. *Herb-Medicine Journal*, *3*(2). https://doi.org/10.30595/hmj.v3i2.6744

Nugroho, M. S. (2022). Pengaruh Pemberian Minuman Isotonik dan Jus Jambu Biji terhadap Pemulihan Denyut Nadi dan Tingkat Hidrasi pada Tim Futsal Permata FC Ponorogo. *Jurnal Prestasi Olahraga*, *5*(3), 90–98.

Nurfrida, D. R., & Lestari, Y. N. (2023). Korelasi Antara Asupan Cairan Dengan Status Hidrasi Pekerja Bagian Produksi Air Minum Dalam Kemasan di Pt.X Semarang. *Jambura Journal of Health Sciences and Research*, *5*(2), 862–873. https://doi.org/10.35971/jjhsr.v5i3.20760

Pramono, B. A., Sifaq, A., & Bulqini, A. (2018). Efek Posisi Tubuh Setelah Berlatih Terhadap Masa Pemulihan. *JSES : Journal of Sport and Exercise Science*, *1*(1), 25–29. https://doi.org/10.26740/jses.v1n1.p25-29

Ramdhan, R. I., & Rismayanthi, C. (2016). Hubungan Antara Status Hidrasi Serta Konsumsi Cairan Pada Atlet Bola Basket. *Medikora*, *15*(1). https://doi.org/10.21831/medikora.v15i1.10068

Rodriguez-Giustiniani, P., Rodriguez-Sanchez, N., & Galloway, S. D. R. (2022). Fluid and electrolyte balance considerations for female athletes. *European Journal of Sport Science*. https://doi.org/10.1080/17461391.2021.1939428

Rubiono, G., & Setiawan, D. (2020). Review Tren Minuman yang Dikonsumsi Untuk Pemulihan Fisik Saat Olahraga. *Jurnal Olahraga Dan Kesehatan*, *3*(1). https://ejournal.unibabwi.ac.id/index.php/semnassenalog/article/view/1105

Samodra, Y. T. J. (2020). Pengaruh dehidrasi (kehilangan) cairan 2.8% terhadap prestasi lari 400 meter. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*. https://doi.org/10.29407/js_unpgri.v6i2.14484

Sannolo, M., & Carretero, M. A. (2019). Dehydration constrains thermoregulation and space use in lizards. *PLoS ONE*, *14*(7), 1–17. https://doi.org/10.1371/journal.pone.0220384

Sari Maslicha, L. W., & Anang S.B, T. W. (2017). Hubungan Asupan Kalium Dan Natrium Dengan Kejadian Dehidrasi Pada Remaja Di Smk Muhammadiyah 04 Boyolali. *Profesi (Profesional Islam) : Media Publikasi Penelitian*, *15*(1). https://doi.org/10.26576/profesi.222

Schäfer, A., & Vagedes, J. (2013). How accurate is pulse rate variability as an estimate of heart rate variability?: A review on studies comparing photoplethysmographic technology with an electrocardiogram. *International Journal of Cardiology*, *166*(1), 15–29. https://doi.org/10.1016/j.ijcard.2012.03.119

Senay, L. C. (2022). Water and Electrolytes During Physical Activity. In *Nutrition in Exercise and Sport* (pp. 257–276). https://doi.org/10.1201/9780367813499-11

Setiarini, A., Laksana, M. W., & Winarno, B. (2021). Sistem Monitoring Frekuensi Denyut Nadi pada Pelari Menggunakan Metode Photoplethysmographic. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *8*(6). https://doi.org/10.25126/jtiik.2021863729

Suprabaningrum, A. R., & Dieny, F. F. (2017). Hubungan konsumsi cairan dengan status hidrasi pekerja di suhu lingkungan dingin. *Journal of Nutrition College*, *6*(1). https://doi.org/10.14710/jnc.v6i1.16896

Sutarna, N. (2021). Sistem Pendeteksi Keasaman dan Warna Urine sebagai Indikasi Dini Dehidrasi. *ELECTRICES*, *2*(2), 57–61. https://doi.org/10.32722/ees.v2i2.3570

e-ISSN:2988-4942

Information about the authors:

Dirzal Apriandi; f1251211019@student.untan.ac.id; Department of Sports Coaching Education, Faculty of Teacher Training and Education, Universitas Tanjungpura; Pontianak, Indonesia

Vince Louisse D. Salacup; vlsalacup@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Reygan A. Butali; rabutali@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Derick Sam A. Cadiente; dccadiente@mmsu.edu.ph; Department of Physical Education, College of Arts and Sciences, Mariano Marcos State University; City of Batac 2906, Ilocos Norte, Philippines

Roy Ardian; royardian2023@student.uny.ac.id; Department of Sport Science, Faculty of Sport and Heath Science, Universitas Negeri Yogyakarta; Yogyakarta, Indonesia

Irvan Septianto; irvanseptianto2023.student@uny.ac.id; Department of Sport Science, Faculty of Sport and Heath Science, Universitas Negeri Yogyakarta; Yogyakarta, Indonesia

Jihan Azrina; jihanazrina00@gmail.com; Department of Sport Science, Faculty of Sport and Heath Science, Universitas Negeri Yogyakarta; Yogyakarta, Indonesia

TAJOR: Tanjungpura Journal of Coaching Research

Tanjungpura Journal of Coaching Research

Support by :
Departmant of Sport Coaching Education
Universitas Tanjungpura

https://jurnal.untan.ac.id/index.php/TAJOR/index

Our Journal Indexed by:

Dimensions | GARUDA | Google Scholar | Crossref